Implementation of Common Core State Standards for Mathematics with African American and Hispanic American Students: Successful Common Practices

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ABSTRACT

In an era of high-accountability and high-stakes testing teachers are challenged to find ways to create learning environments focused on active student participation where learning is constructed through higher-order competencies. This study is prompted by the recent adoption of the Common Core State Standards for Mathematics (CCSSM) and examines the common practices of five successful teacher models in relation to its implementation. Using a basic qualitative research design, this study uses a comparative analysis of multiple data sources to determine if common practices or meanings exist among teachers who are successful in implementing CCSSM. Five teachers in grades 6 through 8 participated in this study over a period of 6 months. Primary data sources included interviews and documents. Data were analyzed using a comparative analysis across cases and data sources. Findings indicated that common practices existed among the participants during their implementation of CCSSM. Findings also showed common patterns related to aspects of the classroom/school environment that influence the participants' implementation of CCSSM with African American and Hispanic American students.

TABLE OF CONTENTS

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Chapter I

INTRODUCTION

A vital element in the human capital of a nation is "the quality of its schools as measured by math and science skills" (Lee & Fish, 2010, p. 109). In line with this notion, the United States maintains the goal to offer a world-class education allowing students to compete with international peers in the workforce and academically (National Council of Teachers of Mathematics, NCTM, 2012). However, when comparing educational systems, NCTM (2012) argued the United States (U.S.) ranks lower than many top-performing nations. Research trends continue to identify lagging educational achievement gaps between the U.S. and international countries (Kortez, 2009; Lee, 2002; Lee & Fish, 2010; NCTM, 2012).

Even more significant are the various studies, which explored the achievement gaps among students within the U.S. (Darling-Hammond, 2000; Lee, 2002; Lee, 2004; Lewis, 2007; McKown, 2013; Riegle-Crumb & Grodsky, 2010). The achievement gaps identified by McKown (2013) show significant differences among U.S. students on measures of school readiness and academic achievement. McKown (2013) found that in the U.S., Asian American students achieved higher average scores than European American students, who achieved higher average scores than African American and Hispanic American students. The National Center for Education Statistics (NCES) in 2011 found while 11% of European American students reached the advanced level

on the National Assessment of Education Progress (NAEP) eighth-grade mathematics exam, only 2% of African American students and 3% of Hispanic American students reached the advanced level (Olszewski-Kubilius & Clarenbach, 2014). According to Darling-Hammond (2000), standards-based curriculum reform is an important avenue to improve the struggle of closing the educational achievement gap between African American and European American students.

In 2000, the NCTM *Principles and Standards for School Mathematics* advocated for all students to have the opportunities and support necessary to learn mathematics with a deep conceptual understanding. Similarly, the recent widespread adoption of the Common Core State Standards for Mathematics (CCSSM) continued the shift towards preparing students with the skills needed to think critically and solve complex problems (Polly & Orrill, 2014; Rothman, 2012). The potential of CCSSM to offer a deeper, more coherent curriculum for all students is promising for mathematics educators (Russell, 2012). Some opponents are concerned CCSSM will thrust schools and teachers to become "more focused on high-stakes tests…implemented as a list of items to 'cover' rather than a lattice on which strong teaching and learning must be woven" (Russell, 2012, p. 50).

This current study contributes to the literature on the improvement of mathematics pedagogy of minority students by exploring the common practices used by teachers who find success implementing CCSSM with African American and Hispanic American students. According to Cobb and Hodge (2002), the challenge for education is to help foster an unbiased and inclusive society that will be perceived as valid for all students. Framing the current study are the broader concerns of a society that continues

to impact mathematics education: (1) curriculum reform, (2) equity, (3) and the classroom/school environment's influence on mathematics teaching and learning.

Many studies related to mathematics curriculum reform have focused on teacher characteristics (Charalambos & Philippou, 2010; Drake & Sherin, 2006; Manouchehri & Goodman, 2000; Remillard, 2005; Remillard & Bryans, 2004). Some studies have also indicated a number of personal characteristics and capacities affecting curriculum reform implementations, including teachers' content and pedagogical knowledge, capacity, beliefs, efficacy, and orientation towards the curriculum (Charalambos & Philippou, 2010; Lamb, 2010; Superfine, 2008). In an analysis of the research on curriculum use, Remillard (2005) placed studies of teacher characteristics into two prominent categories: their beliefs and their knowledge. He further concluded teachers are important elements in curriculum reform and their perspectives help to explain the differences seen among teachers when working with the same curriculum.

Scholars investigating teacher characteristics related to curriculum reform have mostly examined them as causes of concern, rather than possibilities for improvement. Chistou, Eliophotou-Menon, and Phillippou (2004) found teachers seemed to focus on the processes and tasks involved in using mathematics curriculum materials along with concerns related to managing and organizing time demands. Schoen, Cebulla, and Finn's (2003) research indicated the importance of teachers to embrace strategies, which are designed to impact learning for all students. The current study focused on teachers who find the means to impact learning for students despite the challenges of curriculum reform and equity.

Bennett (2007) maintained educational excellence in schools can not be accomplished without educational equity. The National Council of Teachers of Mathematics (NCTM, 2000) named equity as one of its guiding principles, and stated, "equity does not mean every student should receive identical instruction; instead, it demands reasonable and appropriate accommodations be made as needed to promote access and attainment for all students" (p. 12). NCTM (2000) specifically noted that teachers need to understand and attend to students' cultural needs. However, much of the previous research regarding minority students and mathematics achievement showed African American and Hispanic American students consistently scored below national norms on standardized assessments (Lee, 2012; Lubienski, 2002a; Olszewski-Kubilius & Clarenbach, 2014; Plank & Condliffe, 2013).

Despite American reform efforts to improve student achievement, research indicated differences in curriculum implementation were still present in schools, that served large populations of African American and Hispanic American students (Darling-Hammond, 2000; Howard, 2003; Lewis, 2007; Olszewski-Kubilius & Clarenbach, 2014; Smith, 2004). According to Smith (2004), a significant challenge of curriculum reform is its ability to support efforts to close the achievement gap between European American and African American students. He contended one of the means of closing the racial/ethnic achievement gap is to ensure equal access to high-quality teachers, safe learning focused environments, and provision of high-quality curricular resources for all students.

Various researchers have examined issues of equity in mathematics teaching and learning through the challenges teachers face instructing ethnically diverse students (Cobb & Hodge, 2002; Lubienski, 2002b). Researchers indicated teachers who embrace reform teaching and equity use common means to encourage students' mathematical communication, promote conjecturing, problem-solving and investigation, while valuing students' thinking (Franco, Sztain, & Ramalho-Ortigao, 2007; Gutierrez, 2000; Lubienski, 2002b).

In examining the research on the influences of the classroom/school environment on student achievement, some studies found the school's environment can have an influence on the mathematics achievement of students (Opdenakker & Damme, 2001; Opdenakker & Damme, 2007). More importantly, Opdenakker and Damme's (2001) research indicated relative to school improvement, some teachers need more help than others making connections with their students because of their school composition.

Charalambos and Philippou's (2010) research indicated teachers are pressured by a variety of classroom/school environmental concerns related to curriculum reform, including tasks concerns, such as time constraints and pressure to cover the curriculum. In a similar manner, additional pressures are placed upon teachers by current teacher evaluation systems promoting student-centered academic environments in which teaching and learning occur at high levels (Georgia Department of Education, 2012).

Statement of the Problem

This research sought to examine the persistent achievement gap in school communities where the dominant populations are African American and Hispanic

American students, and school communities where the dominant populations are European American and Asian American students. Common Core curriculum expectations of high standards for all students create classroom challenges for many teachers, particularly teachers of African American and Hispanic American students. This research identified common practices used by teachers who find success implementing CCSSM with African American and Hispanic American students to support the means of closing the racial ethic achievement gap. Current research is needed that identifies aspects of the classroom/school environment influencing teachers' abilities to impact the mathematics achievement of diverse student learners.

Purpose of Research

Using qualitative research methods, this study compared several data sets to arrive at reliable interpretations of the interactions of teachers with curriculum materials and students. The purpose of the current study was to provide a rich descriptive analysis of the common practices used by teachers who find success implementing CCSSM with African American and Hispanic American students. While examining the successful practices of teachers, this study further identified aspects of the classroom/school environment that impacted teachers' active engagement in CCSSM.

Research Questions

The following research questions guided this study:

RQ1: What are the common practices used by teachers who find success implementing CCSSM with African American and Hispanic American students?

RQ2: What aspects of the classroom/school environment impact the common practices of teachers who find success implementing CCSSM with American and Hispanic American students?

Significance of the Study

The current study is significant as it identified the common practices of teachers who found success implementing CCSSM with African American and Hispanic American students. Through the identification of these common practices, analysis revealed the aspects of the classroom/school environment that impact these common practices. School leaders and math teachers are provided common practices that may be applied to teacher development and math curriculum design.

Conceptual Framework

Four paradigms supported the conceptual framework for the current study including my personal interest, curriculum reform, equity, and the classroom/school environmental influences on students' mathematics achievement. My personal interest in the current study is formed from 18 years of work with ethnically diverse students and teachers with mathematics curriculum implementation and reform. This work allowed me to occupy several roles as a mathematics teacher leader for 16 years, including Department Chair, Instructional Coach and Program Specialist. My varied background experiences working at the middle school level with mathematics curriculum, students, and teachers helped frame my understanding and analysis of the current study.

The standards-based curriculum reform, with its efforts to improve teaching and learning, is the main paradigm examined in this study. A significant body of research on

curriculum reform maintained teachers and students construct curriculum as they engage in classroom activities (Bruce & Ross, 2008; Drake & Sherin, 2006; Manouchehri & Goodman, 2000; Remillard, 2000; Remillard & Bryans, 2004). The practices through which teachers construct and enact "curriculum processes" as described by Remillard and Bryans (2004), were underlying assumptions of this research. Remillard and Bryans' (2004) work is grounded in the relationships among teachers' knowledge and beliefs about mathematics, teaching, and learning and their practices in the classroom. According to Remillard and Bryans (2004), the use of a curriculum is impacted primarily in the following three ways:

1. the teachers' orientation or interpretation of curriculum and the extent to which it matches their ideas;
2. the ways a teacher interacts with curriculum, but also by their beliefs and ideas about learning mathematics and the role of teaching mathematics; and
3. the implemented curriculum that is shaped by students' practices in the classroom environment (p. 364).

The third major paradigm underpinning this research is the role of equity and the mathematics achievement of African American and Hispanic American students. Developing an understanding of equity was essential to examining how teachers who are considered successful models enacted standards with both African American and Hispanic American students. According to Hand (2012), "teachers who engage in equitable mathematics teaching centered their instruction on inviting students to become a part of the classroom community" (p. 239). In addition, Gay (2013) contended teachers

who employ culturally relevant pedagogical practices are guided by the principles of equitable teaching. Research conducted by Hand (2012) supported the following criteria as a means to operationalize equitable mathematics teaching:

1. engages a broad range of learners from dominant and nondominant ethnic, racial, and linguistic backgrounds in rigorous mathematical inquiry;
2. achieves measurable success with nondominant learners as measured by content-aligned tests and open-ended projects;
3. promotes competence, ownership, and belonging in the classroom among a broad range of learners; and
4. invites few incidents of classroom opposition (p. 237).

Although these measures are not inclusive, they are key features visible in equitable mathematics instructed classrooms (Hand, 2012). Lubienski (2002b) maintained the importance of equity as a guiding principle and encouraged the need for teachers to understand and attend to the cultural differences of students.

Lastly, this research focused on the influence the classroom/school environment has on the achievement of African American and Hispanic American students. Boonen, Speybroeck, and Bilde (2014); Harrison-Jones (2007); and Opdenakker and Damme (2001) suggested the classroom/school environment has an impact on minorities' mathematics achievement, particularly among African American students. More specifically, Harrison-Jones (2007) indicated school environmental concerns focused on high-stakes accountability influenced by the *No Child Left Behind* (NCLB) legislation that required schools to focus on the achievement of traditionally underserved students.

Although a quantitative analysis, research by Opdenakker and Damme (2001) found important relationships between school composition and school process variables in secondary schools. This study confirmed the important relationships between the variables of school composition and school process, an orderly learning environment, and cooperation among teachers.

Overview of Methodology

This study utilized a qualitative research approach established in the basic interpretivist theory. The basic qualitative design was best suited because the purpose of this study was to understand how teachers make sense of their practice and experiences (Merriam & Associates, 2002). Basic interpretive research approach allowed meaning to be constructed and interpreted throughout the process of collecting data and engaging with teachers in their environments (Merriam & Associates, 2002). According to Merriam and Associates (2002), individuals constructed meaning as they interacted with and interpreted their world. Particular to interpretive research was the examination of social inequalities, which suggested schools focus on how to help lower socioeconomic "children bridge the gap between their own skills and those that the larger society demands within the context of schooling" (Pai & Adler, 2001, p. 147). This perspective requires one to understand the significance of the schooling-society relationship by interpreting the meanings of interactive patterns among these groups, curricula and school achievement (Pai & Adler, 2001, p. 145).

In order to gain an understanding of common practices used by teachers who find success implementing CCSSM with African American and Hispanic students, data was

collected through multiple sources including interviews and documents. The primary means of data collection was audiotaped (and transcribed) semi-structured interviews. Samples of curriculum documents were collected as a second data source. These documents provided additional data to support the development and understanding of the classroom practices that existed with teachers' implementation of CCSSM.

Limitations

The current study raised several areas of concern for possible limitations. According to Merriam (2009), ethical dilemmas are likely to emerge regarding data collection and analysis in qualitative studies. A small sample size from which patterns and themes emerged was a limitation of this study, but is consistent with qualitative research. Limitations also included my current position or biases associated with supporting and investigating CCSSM implementation and selecting participants. To minimize this concern, I implemented qualitative practices of rich data collection, critical reflection and continued to examine the question "Are we observing or measuring what we think we are observing or measuring" (Maxwell, 2013, p. 101)?

Limitations were also possible in the methodology and data collection sources including interviews and documents. This current study relied heavily on teachers' self-reported data through interviews and documents collected. Interview data may have been influenced by my personal bias, anxiety, and participants' awareness of the process (Patton, 2002). Documents may have been limited in what the teachers were willing to provide and may also be incomplete. Using a combination of methods built on the strengths of each data source while minimizing the weaknesses in any one approach

(Patton, 2002). Additionally, having one primary researcher was another limitation of this study, especially with large amounts of data to transcribe and code. To address this concern, data was collected from multiple sources and across participants to provide triangulation. To increase reliability and validity in this study, member checking was utilized to ensure interpretations of interviews and documents were plausible.

Discussion of Terms

The following are a list of terms to provide further clarification in this study. In some cases, there are multiple meanings for several terms and scholars in literature define some terms differently. The definitions listed here are to provide a clear understanding of how the terms are being used in the current study**.**

Classroom/School Environment. The physical environment, policies, practices, as well as the relationships and the interactions among different participants in relation to content, teaching, and learning (Opdenakker & Damme, 2007).

Common Core State Mathematics Standards: College- and career-ready standards for kindergarten through twelfth grade in English language arts/literacy and mathematics, developed by education chiefs and governors in 48 states. Currently, the majority of states have voluntarily adopted and are working to implement the standards, which are designed to ensure students graduating from high school are prepared to take credit bearing introductory courses in two- or four-year college programs or enter the workforce (Frey, Garfunkel, Briars, Isaacs, Pollack, Robinson, Scheaffer, Schoenfeld, Seeley, Teague, & Usiskin, 2014).

Culturally Relevant Pedagogy. Instruction that uses cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning experiences more relevant and effective for them (Gay, 2013, p. 49).

Curriculum. Curriculum refers to the plan for what should be taught and the resources teachers use when designing instruction and deciding what will be enacted in the classroom to meet the specified objectives.

Enacted Curriculum. The actual constructed classroom activities (Remillard & Bryans, 2004).

Equity. The fair treatment of all students regardless of race, ethnicity, gender, sexual orientation, different physical abilities, socioeconomic status as it relates to quality, resources, and access to challenging curricula so students "develop sociopolitical consciousness, develop a sense of agency, and develop positive social/cultural identities" (Martin, 2003, p. 14).

High-Stakes Accountability. In an effort aimed at raising student achievement, high-stakes accountability describes a climate of increased pressures in response to federal, state, and local policies experienced by educators due to the implementation of *No Child Left Behind* (Harrison-Jones, 2007; Valli & Buese, 2007).

High-Stakes Testing. The practice used by educators to make decisions concerning a student's progress based on the results of a standardized assessment score (Harrison-Jones, 2007).

Intended Curriculum. Teachers' aims for instruction is referred to as the intended curriculum (Remillard & Bryans, 2004).

Manipulative. An object which is designed so a learner can perceive some mathematical concept by manipulating it (Van de Walle, 2007).

Mathematics Contact. Serves as a teacher liaison between the district and school to support teachers with curriculum implementation and district policies.

Mathematical Task. A mathematical problem or set of problems which address a related mathematical idea or concept. Many of these problems do not afford a single solution and are embedded in real life contexts (Ross, McDougall, Hogaboam-Gray & LeSage, 2003).

Organizational Structure. Organizational structure of the school is defined as the relationships between school composition (student, teacher population and school leadership), school context (location), and school practices on teaching and learning (Opdenakker & Damme, 2007).

Successful Teacher Models. Teachers who have 2 years teaching experience with CCSSM, have a reputation within their school community as successful in implementing CCSSM, a self-identified commitment to students' success, and standardized-test results which are comparatively higher than their district and state results for African-American and Hispanic students.

Standards for Mathematical Practice. A variety of expertise that mathematics educators at all levels should seek to develop in their students (Common Core State Standards Initiative, 2015).

Teacher Leader. Teachers who individually or collectively influence their colleagues, principals and school community to improve teaching and learning practices with the aim of increasing student achievement (Bassett, Kajitani, & Steward, 2014).

Summary

The current study's intent was to provide insight to an existing gap in the literature by examining how teachers enact CCSSM in an era of high-stakes accountability with African American and Hispanic American students. An analysis of the classroom/school environment demonstrates how curriculum implementation may influence teacher success. The remaining sections are comprised of Chapter 2, which included a review of the literature covering curriculum reform, equity, and the classroom/school environment's impact on minority students' mathematics achievement. Chapter 3 describes the methodology used to complete the current study. Chapter 4 summarizes the results through the examination of patterns and themes using a comparative analysis across cases. Chapter 5 provides a summary of the research, a discussion of the findings, limitations, and suggestions for further research.

Chapter II

LITERATURE REVIEW

Introduction

The current study examined common practices of teachers who find success implementing CCSSM with African American and Hispanic American students in the context of their school communities. This study identified aspects of the classroom/school environment that impacted diverse students' active engagement in CCSSM. The intent was to gain insight into the thinking and strategies these teachers employed while implementing curriculum reform, facing issues of equity and the pressures of high-stakes accountability. This literature review focused on the interfaces of three paradigms comprising curriculum reform, equity, and the classroom/school environment, which are key concepts framing this dissertation study.

The primary goal of the literature review was to survey prior research on the key aspects framing the current study. The first section provides literature on standards-based curriculum reform efforts in mathematics and examined three major areas influencing teachers' practice and students' learning. The first section explores ways prior standards-based curriculum efforts connect with the current expectations of CCSSM. The second section explored the role equity plays in mathematics teaching and learning by reviewing the literature examining ethnically diverse students' achievement in mathematics classrooms. Specifically noting the literature involving the successful

models and practices impacting the teaching and learning of African American and Hispanic American students.

The third section investigates areas of the classroom/school environment that influence the teaching and learning of ethnically diverse students. In other words, what elements are present in settings, which either motivate or discourage curriculum implementation? In this section, research related to the classroom/school environment's impact on mathematics teaching and learning is examined. An examination of the connections between the three factors of curriculum reform, equity, and the school environment in the current study concluded the literature review.

Standards-based Curriculum Reform

During the 1990s, the National Science Foundation (NSF) funded grants to math educators to write curriculum aligned to the 1989 National Council of Teachers of Mathematics (NCTM) standards (McCaffrey, Hamilton, Stecher, Klein, Bugliari, & Robyn, 2001; Reys, Reys, Lapan, Holliday, & Wasman, 2003). Early studies indicated students who are instructed using standards-based curriculum materials performed significantly better on state tests than students who are instructed using traditional resources (Fuchs, Fuchs, Hamlett, & Stecker, 1991; Hirschhorn, 1993; McCaffrey et al., 2001; Reys et al., 2003). NSF and NCTM, helped pave the way for states to move towards a standards-based mathematics curriculum.

Five significant shifts accompanied these early reform efforts focusing teachers on (1) viewing classrooms as a community of learners; (2) building students' ability to use logic and mathematical evidence rather than relying on the teacher as the expert; (3) encouraging mathematical reasoning over memorization procedures; (4) focusing on

problem solving, conjecturing and inventing rather than rote algorithms; (5) emphasizing connections among ideas and applications rather than isolated concepts and procedures (McCaffrey et al., 2001, p. 494).

Research studies over the past two decades continued to emphasize the importance of standards-based curriculum reform efforts on classroom instructional practices (Drake & Sherin, 2006; Mac Iver & Mac Iver, 2009). Manouchehri and Goodman (2000), Remillard (2000), and Remillard and Bryan (2004) characterized three major areas that influenced standards-based reform teaching and learning. These were: (1) teachers' orientations of the curriculum, (2) their interactions with the curriculum, and (3) how the curriculum is established during their classroom instruction. Mac Iver and Mac Iver's (2009) research investigated the significant gains in school districts that implemented standards-based curriculum reform with extensive professional development for teachers. Other studies examining teachers' orientation of curriculum, showed the significance of standards-based curriculum reform in developing an understanding of the interactions of teachers with curriculum and their thinking about their practice (Charalambos & Philippou, 2010; Drake & Sherin, 2006; Manouchehri & Goodman, 2000; Remillard, 2005; Remillard & Bryans, 2004).

In addition to understanding standards-based curriculum reform implementation, a deeper understanding of the objectives of CCSSM was an essential element in the current study. There was limited literature available examining the influences of CCSSM on teaching and learning, particularly in settings with ethnically diverse students.

Teachers' Orientation or Interpretation of Curriculum

Often, changes in curriculum reform efforts may be adopted and not fully implemented as planned because of teachers' orientation towards the curriculum (Manouchehri & Goodman, 2000). Various researchers have investigated teachers' orientations in the early stages of mathematics curriculum implementation (Drake & Sherin, 2006; Manouchehri & Goodman, 2000; Remillard, 2005; Remillard & Bryans, 2004). These studies suggest teachers' implementation of curriculum is influenced by perceptions and interpretations of the curriculum materials.

Manouchehri and Goodman (2000) conducted a case study analysis to investigate the process of evaluation and implementation of standards-based curriculum by two seventh grade mathematics teachers. Results from this research showed teachers' personal values were attributed to what they thought were important regarding standards-based curriculum and assisted in shaping their classroom instruction. In addition, Manouchehri and Goodman (2000) found both teachers brought views to their teaching from their personal experiences, which impacted their expectations of the curriculum and instructional practices. This research indicated two teachers exhibited conflicting views in regards to their personal reflections and classroom implementation. For one teacher, challenges were faced during implementation due to disconnections between views and realities. The second teacher experienced comfort during implementation because of the compatibility between views and realities of teaching the standards-based curriculum (Manouchehri & Goodman, 2000). They concluded a teacher's mathematical knowledge

was the greatest influence on how teachers planned instruction, engaged students, and used curriculum materials.

Remillard and Bryans (2004) also looked at patterns in orientations across multiple teachers during the implementation of mathematics curriculum reform. Their research sought to gain a greater understanding of the relationship between the use of standards-based curriculum materials and teacher learning by examining eight teachers' use of curriculum materials in the same school. They defined the construct of a teachers' orientation towards curriculum as their perspectives and dispositions towards mathematics teaching, learning and curriculum, which also influenced their engagement, and interactions with curriculum (Remillard & Bryans, 2004). They further argued a teacher's orientation ultimately influences the opportunities in the classroom for teaching and learning. This research revealed teachers in the process of pedagogical change began to think about mathematics teaching and learning differently and were more likely to struggle with how to use these ideas in their classroom. They indicated teachers' orientation influenced the use of curriculum regardless of whether or not they agreed with the goals of the reform efforts.

Remillard and Bryans' (2004) findings further showed teachers' orientation towards curriculum materials is impacted by their views of the curriculum and how it fits into their own ideas about mathematics teaching and learning. In comparing data from eight teachers, Remillard and Bryans (2004) found the teachers' orientation towards the curriculum and the way they used it were closely aligned to the way they conceptualized the curriculum in their teaching. For example, when teachers viewed curriculum

materials as a possible guide in teaching, it was reflected in their sincerity to use them with fidelity. On the other hand, teachers who viewed the curriculum as a resource for activities, their orientation reflected a selective use of the curriculum (Remillard & Bryans, 2004).

Similarly, Drake and Sherin's (2006) research is also significant to the current study because, it too, uses qualitative research methods to investigate patterns in adaption for two urban elementary teachers. Their research contends that in order to make curriculum reform more effective in promoting extensive change in mathematics instruction, it is vital to understand the details of how and why teachers use reform curricula to guide their instructional practices. They further argued changes have not occurred in teacher practices just because reform materials exist in the classroom. Consistent with the prior research, Drake and Sherin also found two teachers' orientation towards curriculum was impacted by their interpretations of their experiences with mathematics and were connected to the ways they thought about and made adaptations for their students.

According to Drake and Sherin (2006), teachers must make sense of the curriculum before using it in their teaching and learning practices. They further claim teachers make sense about reform curriculum through their identities as learners and teachers of mathematics. Their study found teachers' analyses of their experiences with mathematics were revealed in their patterns of adaptions. For one teacher, reflections on mathematical experiences indicated vision of "what mathematics instruction should not be" (Drake & Sherin, 2006, p. 278). This teacher's pattern in adaptions focused on

helping students makes connections between "mathematical language and mathematical concepts" (Drake & Sherin, 2006, p. 178). Based on this teacher's adaptions, students were empowered to create their own understanding of mathematics because classroom instruction facilitated students' increase in control over the activities. However, the second teacher in this study did not have strong memories of her mathematical experiences. Although the second teacher could see the big ideas and understand the end goal, she had difficulty making the needed instructional steps. For example, "she often did not read the directions for lessons …when she did read the directions, she made major adaptations to them" (p. 179).

Charalambos and Philippou (2010) conducted a mixed methods study based on the assumption educational reform poses additional demands on teachers' current complex work, thereby igniting teacher concerns. The study revealed some teachers needed more information or awareness concerning reform. Their findings also confirmed results from prior studies; teachers implemented the reform fundamentally different than the goals and philosophy of the reform (Charalambos & Philippou, 2010).

Teachers' Interactions with Curriculum

To develop a more comprehensive understanding of teachers' experiences in the present research study, this section of the literature review examined teachers' use of mathematics curriculum. While the prior section focused on how aspects of teachers' views and orientations shape the curriculum implementation, this section is primarily concerned with teachers' interaction with the *intended curriculum*. Research has documented the ways teachers interact with curriculum which reflect shared beliefs and

ideas about learning and teaching mathematics (Drake & Sherin, 2006; Remillard, 2005; Stein & Kaufman, 2010). In addition, Manouchehri and Goodman (2000) found teachers' knowledge of mathematics, their ability and skills, are also essential in their assessment and implementation of curriculum materials.

Central to the notion of teacher interaction with the curriculum was the importance of understanding the role of the teacher as interpreter of the written curriculum (Remillard, 2005). To understand this relationship, one must assume that it "is impossible" for the teacher to achieve fidelity between classroom instruction and the written curriculum (Remillard, 2005, p. 220). As such, teachers interpret the intentions and make meaning of the curriculum materials through their own lens of beliefs and experiences (Remillard, 2005, p. 220). Remillard (2005) defined "curriculum use" as "how individual teachers interact with, draw on, and are influenced by" curriculum materials designed to guide instruction (p. 212).

According to Drake and Sherin (2006), understanding aspects of teachers' interactions and beliefs is as important as the content of the curriculum. Remillard's (2005) idea regarded teachers' use of the curriculum as having evolved over time from being less relevant to understanding the curriculum, to a framework which views teachers as active users and designers of the enacted curriculum. What teachers do as they adapt and change curriculum materials to make them appropriate for students is significant to understanding what happens in classroom instruction (Remillard, 2005).

The processes teachers use to enact curriculum resources are interactive and complex (Remillard, 2005). Additional research also illustrated the various ways

teachers interact with curriculum resources by making meaning of it through a variety of uses (Remillard, 2005; Remillard & Bryans, 2004; Sherin & Drake, 2006). For instance, Remillard and Bryans' (2004) study of eight teachers indicated most teachers understood the curriculum as a road map or a guide, while some perceived it as a collection of activities to foster students' thinking, and others saw it as a collection of activities and assignments to provide to students. The different orientations teachers developed towards the curriculum impacted their implementation of the curriculum materials.

Drake and Sherin's (2006) findings indicated that when teachers worked with content rich curriculum, they made different decisions about adaptations (p. 182). Additionally, Drake and Sherin concluded that teachers make adjustments to the curriculum due to their understanding of lessons as designed in the curriculum; their perceptions of students' abilities; and restrictions of time, materials and other resources (p. 160).

In addition, Manouchehri and Goodman (2000) noted that while the time spent on planning lessons was a critical factor in how curriculum resources were implemented, teachers' pedagogical knowledge, skills, and ability were even more significant. Their study found teachers needed to have an understanding of the key mathematical ideas as well as the ability to "see relationships among concepts and have an elaborate knowledge base that included multiple representations of concepts" in order to support students' mathematical knowledge (Manouchehri & Goodman, 2000, p. 27).

Particularly significant were Manouchehri and Goodman's (2000) findings of one teacher's ability to connect personal insights among ideas and determine what was central

to the curriculum and what was not. For example, this teacher investigated each activity in an effort to evaluate the mathematical connections throughout the curriculum while becoming familiar with the ideas presented prior to teaching. On the other hand, a second teacher in this case study failed to make necessary connections and to tie mathematical meaning to the content. Moreover, Manouchehri and Goodman found one teacher's use of curriculum materials in classroom instruction was based on understandings, judgments, and the ability to make explicit connections.

The former studies provided insight into a teacher's role as the interpreter of the written curriculum. In many ways these studies suggested it is possible to achieve a level of fidelity between the written curriculum and the classroom instruction. They also indicated teachers are influenced by their own values and experiences as they engage in understanding and making sense of the curriculum.

Curriculum Shaped by Students in the Classroom Environment

Various scholars have indicated mathematics curriculum reform success depends largely on the classroom teachers' ability to engage students in meaningful mathematical experiences that require higher-order proficiencies (Remillard, 2005; Stein & Kaufman, 2010; Tarr, Reys, Reys, Chavez, Shih, & Osterlind, 2008). Teachers using traditional instructional practices in mathematics education, such as rote memorization, algorithms, defined rules and procedures, may feel apprehensive when moving towards standard-based instruction. According to Tarr et al., (2008), the same curriculum can look very different within and across schools. They argued that two classrooms with the same

curriculum expectations may look very different when the activities of the teachers and students are dissimilar with different learning opportunities provided (Tarr et al., 2008).

Remillard (2005) defined *enacted curriculum* through the understanding of the teacher as an active architect of the activities and interactions that take place within the particular context of the classroom. Moreover, Remillard's conceptual framework reflected the context of the classroom and the demands that may emerge from within this setting into account when examining the enacted curriculum. In other words, this model considered the planned curriculum and the enacted curriculum as "co-constructed by teachers and students" in a classroom context (p. 238). Therefore, the enacted curriculum has the tendency to represent minor or substantial changes (Remillard, 2005).

The Challenges of Enacting the Curriculum

Tarr et al., (2008) conducted a study which used observation indices to measure the frequency and extent of teachers' use of curriculum materials. They found significant diverse enactments of the same curriculum, which resulted in distinct experiences as students and teachers interacted with curriculum materials in the classrooms. Even though their research found a standards-based learning environment was more prevalent among teachers utilizing a rigorous, standards-based curriculum such as the NSF materials, it did not identify essential factors of the implementation impacting student achievement. Their research confirmed other findings, which indicated teachers needed ongoing professional development to support the successful implementation of a standards-based curriculum (Drake & Sherin, 2006; Manouchehri & Goodman, 2000; Marrongelle, Sztajn, & Smith, 2013; Tarr et al., 2008).

Mathematical Tasks

The challenges and benefits of enacting standards-based curriculum materials can also be viewed through the analysis of how teachers implement mathematical tasks. Research by Stein and Kaufman (2010) found that although many rich mathematical tasks invite teachers to prepare for lessons in meaningful ways, they do not solely produce high quality instruction. More importantly, Stein and Kaufman suggested certain factors shape implementation quality. Their study defined a high-quality mathematics lesson as one in which a high level of cognitive demand is upheld throughout, and "in which the teacher attends to students' thinking and uses students' responses to move the class toward the mathematical goals and justify their strategies using mathematical reasoning" (Stein & Kaufman, 2010, p. 671). Stein and Kaufman found a strong relationship between teachers who understood the big mathematical ideas in the curriculum and the cognitive demand of their lessons.

The implementation of mathematical tasks can pose difficulties for students and teachers. The ultimate purpose for implementing mathematical tasks is to influence student learning. However, Stein et al. (2009) found factors that made it difficult for teachers to implement mathematical tasks including cognitive decline in tasks, emphasis shifts, time constraints, classroom management, selection of tasks, and students' accountability.

Stein et al. (2009) asserted that during the implementation of mathematical tasks, features of the task generally remain constant with how they were set up, but the cognitive demands of high-level tasks tended to decline. Some students found it more

difficult to engage in high-level reasoning and problem solving than routine classroom activities. Therefore, such engagement caused students to pressure the teacher to reduce the complexity of the task. The students' levels of cognitive engagement ultimately determined what they learned, and the ways and the extent to which the teacher supported students' thinking and reasoning (Stein et al., 2009).

However, other scholars also warned that "under-achieving students" should not be guarded from engaging in challenging tasks (Clark, Roche, Cheeseman, & Sullivan, 2014, p. 4). They maintained teachers who gave these students simple tasks prevented them from developing self-confidence. They further contended students and teachers found value in engaging in successful implementation of complex tasks. Clark et al. (2014) suggested the following approaches are made to support students' engagement in challenging tasks:

- connect tasks with students' experience;
- explain working expectations, including the type of thinking and expected outcomes; and
- communicate enthusiasm, including encouraging students to persevere without telling students how to do the task (p. 9)

Standards-based reform efforts encouraged the implementation of demanding tasks as a means to support worthwhile leaning in mathematics classrooms. Scholars contended that the decisions teachers make can considerably impact how tasks are played out, the level of students' perseverance and the resulting level of cognitive learning (Clark et al., 2014; Stein & Kaufman, 2010).

Objectives of CCSSM

The past education reform efforts have paved the way for the implementation of a common set of standards across states. The focus of this section of the literature review was to shed insight into the purpose and expectations of CCSSM. CCSSM developed out of a process led by governors, educators, and public-school leaders which sought to establish standards across states of how to best prepare students for college and careers in the 21st century (Jenkins & Agamba, 2013; Marrongelle et al., 2013; Nelson, 2014; Zimba, 2014). Beyond the past standards-based reform efforts, CCSSM offer the unique opportunity to increase the percentage of students who are successful in college and careers (Marrongelle et al., 2013).

Advocates suggested that if educators viewed the CCSSM as a fluid document, it might provide a useful framework to advance efforts in mathematics reform (Frey et al., 2014). Although many states were only in their third year of CCSSM implementation, its significance lay in the collaboration across states. On the other hand, critics argued CCSSM was written and implemented in a time of great challenge and compromise for educators (Russell, 2012). Russell further contended the adoption of CCSSM would bring huge responsibilities tied to federal funding and high-stakes testing. Earlier researchers argued the high expectations of a common core curriculum, without attention to the needs of diverse student learners, would fail to reach its full potential (Gay, 2013).

Elements of CCSSM

The five key elements of the CCSSM which provided a foundation for changes in school mathematics are: (1) a comprehensive and integrated curriculum; (2) mathematical habits of minds, (3) balanced attention to technique, understanding and applications; (4) information technologies and (5) probing and useful assessments (Frey et al., 2014). These key elements are supported Remillard's (2005) study of curriculum materials in mathematics education reform. She argued teachers should have "well-designed curriculum guidance" (p. 316). More important to the current study was her acknowledgement that curriculum development needed to consider ways to support change in teaching (Remillard, 2005).

The first key element of the CCSSM is the shift from 2-year long algebra courses and 1-year geometry courses towards an integrated curriculum in middle and high school. The CCSSM retained essential components of algebra and geometry while incorporating important concepts in statistics, probability, and discrete mathematics fundamental in computer, management and social science in mathematics courses. This idea of integrating standards reinforced the common practice of international mathematics curriculum.

The Standards for Mathematical Practice (SMP) is the second essential element of the CCSSM which described key ways of thinking that mathematically proficient students should know and be able to do when effectively solving problems and making decisions related to mathematical tasks. Teachers' abilities to help students develop vital "mathematical habits of mind" are central to effective mathematics instruction (Frey et

al., 2014, p. 489). One way to develop the SMP in students is through the implementation of mathematical tasks. Researchers strongly recommended exposing students to meaningful and worthwhile mathematical tasks (Clark et al., 2014; NCTM, 2000; Stein et al., 2009; Stein & Kaufman, 2010; Van de Walle, 2007). Mathematical tasks demand students engage with concepts which stimulate them to make purposeful connections to relevant mathematical ideas, while promoting their thinking (Stein et al., 2009). The implementation of tasks into mathematics instruction is critical because it not only focuses students' attention on ideas, but it helps them to develop mathematical thinking and self-regulated learning (Clark et al., 2014; Stein & Kaufman, 2010).

Thirdly, balanced attention to technique, understanding and applications refer to changes in curricula, teaching methods, techniques, understanding and applications required from CCSSM (Frey et al., 2014, p. 489). These practices supported the critical need to engage students in collaboration and exploration of real-world mathematical problems. Leung (2013) emphasized the importance of teachers' use of problem-based approaches in the classroom to develop students' disposition to use mathematics as a reasoning tool outside of school. Leung also contended the primary goal for mathematics is effective problem solving. While the primary focus of the current study was not problem solving, it examined documents selected by teachers to develop a greater understanding of the teachers' implementation of CCSSM based upon the tasks selected for their students.

The use of information technology for teaching and learning is the fourth essential element of CCSSM. Traditional roles of teachers and students in mathematics

classrooms have shifted as a result CCSSM by increasing the effective use of information technologies (Frey et al., 2014).

The final important element of CCSSM is the response to inadequate current assessment tools. CCSSM called for a balance between high-stakes assessments and the extreme accountability measures placed on low-performing schools. The analysis of these five key elements showed connections between the current CCSSM and the past *Principles and Standards for School Mathematics* (NCTM, 2000), which continues to impact standards-based curriculum reform. Both the past and current reform efforts were important to this study primarily because they described important instructional shifts in mathematics curriculum.

Researchers contended that few practices resulted in wide scale changes in classroom practices with the exception of the development of standards-based curricula (Drake & Sherin, 2006; Jenkins & Agamba, 2013). Even more important is the impact standards-based curriculum can have on understanding and problem solving, which are key components for students' development of the SMP (Schoen, Cebulla, & Finn, 2003). Some prior studies showed the importance of teachers embracing strategies, which are designed to impact learning for all students (Drake & Sherin, 2000; Schoen et al., 2003). The current study extended the past research and examined how paradigms within CCSSM, such as mathematical tasks and SMP, are enacted in classrooms among teachers of minority students.

Various studies illustrated the challenges and successes teachers face as a result of their beliefs and orientations towards curriculum reform (Charalambos & Philippou,

2010; Drake & Sherin, 2006; Remillard & Bryans, 2004). The consistent findings among these researchers indicated that when teachers' views are more in line with the goals of the curriculum reform, classroom instruction is more favorable to student learning. They also supported the notion teachers exercise considerable discretion in their use of and implementation of curriculum resource materials.

Although I found no current studies examining teachers' experiences with CCSSM, quantitative research simulation conducted by Schmidt and Hauang (2012) found similarities between CCSSM and the standards of the highest achieving nations on the 1995 Third International Mathematics and Science Study. Their research simulations also found higher NAEP scores resulted with states that had standards more like the CCSSM (Schmidt & Hauang, 2012). While the challenges and expectations of CCSSM are lofty goals for many educators, it offers a unique opportunity to improve teaching and learning for all students.

The Role of Equity in Mathematics Achievement

Despite the goals of American reform efforts, disparities in curriculum implementation are still present in schools with large populations of African American and Hispanic American students (Darling-Hammond, 2000; Lewis, 2007; Smith, 2004). While all teachers are challenged to create classroom learning environments that will emphasize students' active participation in meaningful mathematics, this phenomenon is especially rare in school communities that predominately serve African American and Hispanic American students (Darling-Hammond, 2000). Although researchers gave attention to equity, Lubienski (2002a) argued that historically, researchers have failed to

conceptualize relevant social and cultural issues. In the current study, equity is defined as the fair treatment to all students regardless of race, ethnicity, gender, sexual orientation, different physical abilities, socioeconomic status as it relates to quality, resources, and access to challenging curricula so students "develop sociopolitical consciousness, develop a sense of agency, and develop positive social/cultural identities" (Martin, 2003, p. 14).

Additionally, the high expectations of a standards-based curriculum such as CCSSM to significantly impact the achievement of all students creates classroom challenges for many teachers, particularly teachers of African American and Hispanic American students. CCSSM is important in supporting efforts to close the achievement gap between European American, African American and Hispanic American students. Smith (2004) argued closing the "racial/ethnic" achievement gap is to ensure equal access to high-quality teachers; safe learning focused environments and provides high-quality curricular resources for all students (p. 111). Other scholars also argued the implementation of the CCSSM will require strong teacher engagement and will undeniably bring about more challenges than changes (Marrongelle et al., 2013).

Toward that end, the aim of the current study was to examine common patterns of teachers implementing CCSSM in schools with diverse student populations. Scholars agreed that teachers who embrace reform teaching use common means to encourage students' mathematical communication, promote conjecturing, problem-solving and investigation, while valuing students' thinking (Franco et al., 2007). This section of the literature focused on developing an understanding of the role of equity in supporting the

mathematics achievement of ethnically diverse students. Researchers suggested teachers who employ successful practices with African American and Hispanic American students are implementing the principles of equitable teaching in classroom instruction (Gay, 2013; Hand, 2012; Lewis, 2007). According to Gay (2013), one way to include the principles of equity into classroom instruction is to use culturally relevant pedagogy. Gay (2013) defines culturally relevant pedagogy as using cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning experiences more relevant and effective for them (p. 49). Hand (2012) also contends teachers who are using equitable mathematics teaching engage a wide-range of learners in rigorous mathematical inquiry; attain success with nondominant learners; encourage competence, ownership, and belonging in the classroom; and there are rare occurrences of opposition present during classroom instruction (p. 237).

Teaching that Engages a Broad Range of Learners

Various scholars agreed that teachers are the ultimate shapers of the way the curriculum is implemented (Bruce & Ross, 2008; Manouchehri & Goodman, 2000; Remillard, 2000; Remillard & Bryan, 2004; Rousseau & Powell, 2005). As such, Rousseau and Powell (2005) held there is a significant difference in teachers' response to reform efforts within context, particularly with students in urban and high-poverty areas. Their research found teachers with high proportions of African American and Hispanic American students were more likely to focus on low level skills and less likely to engage in problem solving and reasoning (Rousseau & Powell, 2005).

On the other hand, Lewis (2007) stated, "when teachers deliberately change their belief systems, along with the practices and general culture under which they teach minority children, these children show achievement gains" (p. 344). In line with this notion, Ladson-Billings (1997) indicated students are likely to demonstrate competence when their teachers believe they are competent. She further contended when teachers have high expectations for their students' achievement regardless of their race, social class or personal economic situations, they are more likely to be successful.

According to Hand (2012), teachers can become powerful agents to improve the inequities within classrooms for students. This research indicated when a wide participation of students received support during instruction, they seemed to feel comfortable engaging in mathematical dialogue with each other and the teacher (Hand, 2012). When teachers engage a wide range of learners, they essentially are inviting students to "take up space" in the mathematics classroom instruction (Hand, 2012, p. 238).

Hand (2012) identified three key features present in classroom environments that promote a wide range of learners: (1) classroom interaction supports student dialogue; (2) activities distinctly support mathematical achievement and cultural relevance; and (3) distinct organization of mathematics educational systems is present. The classroom environments described by teachers in this study supported "meaningful and critical, and respectful dialogue" (Hand, 2012, p. 239). For example, in Hand's study when one group of students struggled to identify mathematical tools, they were directed to examine other students' cultural graffiti art, thereby revealing distinct differences in mathematical and

cultural ideas. Although connected to the previous notion, the third key feature also promotes student dialogue through reforming mathematical activities. According to Hand (2012), if teachers are aware of students and are able to relocate mathematical thinking while implementing mathematical activities, more students are engaged.

Although scholars agreed cultural relevant instruction should focus on engaging a broad range of learners, Lubienski's (2002a) study found distinct differences in students from low and high social economic status (SES). Lubienski's (2002a) research examining disparities in the mathematics achievement of European American and African American students indicated that higher SES students seemed to engage more in problem discussions with deeper thought and commitment than lower SES students. Lower SES seemed to face greater challenges engaging in mathematical problems (Lubienski, 2002a).

Teaching that Achieves Measurable Success

One means for meeting the social and academic needs of diverse student populations, according to Howard (2003), is to use culturally relevant pedagogy. Various researchers have indicated that culturally relevant pedagogy provides positive outcomes for economically and ethnically diverse students (Gay, 2013; Howard, 2003; West-Olatunji, Behar-Horenstein, Rant, & Cohen-Phillips, 2008). Gay (2013) indicated culturally relevant pedagogy is aimed at improving achievement in many areas for many students. Research suggested that culturally relevant pedagogy provides simultaneous development of academics and social skills while supporting cultural affirmation and competence. Gay's research was significant because it acknowledged cultural relevant

pedagogy means to support the teaching of academics, skills and processes for various ethnic and cultural groups (Gay, 2013).

Howard (2003) further contended one essential principle of culturally relevant pedagogy is to discard the "deficit-based thinking about culturally diverse students" (p. 197). Although the primary premise of CCSSM is to prepare students for college preparatory mathematics and science, Lewis (2007) concluded that inequalities exist and ethnically diverse students continue to have unequal access to a valued postsecondary education. Similarly, Lubienski (2002b) also found a primary determinant of a students' access to mathematics is the type of mathematics courses taken. Lubienski's (2002b) study examined factors related to the mathematics instruction students receive as assessed by NAEP including course takings, students' mathematical beliefs and behaviors, and teachers' instructional practices and emphases.

In a case study analysis of a high school mathematics department, Gutierrez (2000) found five characteristics present. Characteristics that aided this school's success in getting African American students to take advanced level mathematics included support of a rigorous curriculum, an apparent commitment to students, commitment to a shared initiative, strong and resourceful leadership and standards-based instructional practices. Moreover, Gutierrez found the success of the mathematics department in his study was attributed to how far students reached in their mathematics curriculum by twelfth grade. Similarly, using quantitative analysis, students showed positive residuals on regressions that predicted their participation in advanced level courses and students

showed greater than predicted scores on their mathematics achievement tests (Hand, 2012).

Nonetheless, researchers showed mathematics achievement can be the main "economic gatekeeper" for many students (Lubienski & Gutierrez, 2008). Although many current classroom environments do not necessarily promote equity, the current study suggested a need for all students to develop their academic skills. As such, scholars maintained that when some students feel more culturally detached from the mathematics curriculum than others, equal outcomes do not essentially mean equitable outcomes (Lubienski & Gutierrez, 2008). Lubienski and Gutierrez (2008) suggested the importance of making cultural connections to mathematics instructions as a tool to help support the development of more equitable classroom outcomes for all students. According to Ladson-Billings (1995), teachers who employed culturally relevant pedagogy "require that students maintain some cultural integrity as well as academic excellence" (p. 160). One African American male teacher in Ladson-Billings' study found that when students were successful in their skills and abilities, they were challenged to become academic leaders rather than entering into an unreceptive relationship. Furthermore, this teacher encouraged English Language Learners to use their native language while they also learned English. These practices stimulated mathematical success while creating a classroom environment that promoted equity for all students.

Teaching that Invites Few Incidents of Classroom Opposition

The culture of classroom environments continues to adversely shift, making it difficult for teachers to practice equitable principles (Gay, 2013; Hand, 2012). Even so, standards-based curriculum reform encourages teachers to create environments that limit students' opposition by engaging them in mathematical discourse (Gay, 2013). Engaging in equitable mathematics teaching requires classrooms to focus on building communities of learners (Gay, 2013; Hand, 2012). Ladson-Billings (1997) offered teachers must extend beyond their knowledge of how best to teach diverse learners to building classroom communities. This researcher suggested teachers who are successful with diverse learners are able to build and maintain strong interpersonal relationships with students. Hand (2012) described equitable mathematics instruction as one teacher's ability to actively seek understanding of students' experiences and effectively shifting the classroom instruction to support students' mathematical achievement. Scholars suggested teachers who established classroom norms found increased student engagement in mathematical discourse (Gay, 2013; Hand, 2012).

Other scholars examining successful teachers' instructional practices with cultural relevant pedagogy also found patterns in their teaching (Battey, 2013). In a case study, Battey (2013) examined an urban classroom of African American and Hispanic American students engaging in substantive mathematics and reform-minded pedagogical strategies. He found four characteristics present in which relational interactions facilitated access to mathematics: addressing behavior, framing mathematics ability, acknowledging student contributions, and attending to culture and language. Battey (2013) found the teacher in

his case study used relationships to support reform practices that encouraged students to go deeper into mathematics.

Classroom environments, which invite few incidents complement the experiences of minority students and stimulate higher order thinking and creativity among them (Lattimore, 2005). Lattimore used the voices of two African American students to determine effective ways to channel students' energy in the mathematics classroom. A student in this study shared teachers needed to present mathematics in a broader view so that it would travel beyond the classroom and students would want to engage in mathematics. Lattimore (2005) further suggested replacing the traditional instructional models of worksheets, textbooks and drill-n-skill activities with hand-on activities, interrelated learning experiences, fieldtrips, and classroom visitors.

The differences in the positions of culturally responsive teachers can be seen in the way they handle off-task behavior. Hand's (2012) research suggested teachers might inquire about a students' task rather than ask questions related to their behavior. Two distinct responses make important assumptions about what the students are doing and either support or discourage classroom environments that are open to dialogue. These researchers shared the construct that when classroom environments limit incidents of opposition, more opportunities are provided for students' success (Battey, 2013; Hand, 2012; Lattimore, 2005).

Many scholars argued closing the racial/ethnic achievement gap would undoubtedly require equitable principles of teaching and learning (Hand, 2012; Lubienski, 2002a; Smith, 2004). To that end, the current study sought to uncover the

practices employed by teachers who find success improving the achievement of ethnically diverse students during this recent standards-based reform era of Common Core State Standards. A review of the literature found teachers who create classroom environments that engage a wide-range of students in worthwhile mathematical inquiry, supported the success of nondominant learners, promoted competence, encouraged self-directed learning and provide instruction with few incidents of opposition, find greater success improving the learning of ethnically diverse students (Hand, 2012; Rousseau & Powell, 2005; Smith, 2004). While the research offered several suggestions for how culturally relevant pedagogy can support closing the racial/ethnic achievement gap, there is a need for a more comprehensive model describing this relationship in the current era of high-stakes accountability.

Classroom/School Environment

The classroom/school environment's intersection with curriculum reform and equity is the fourth paradigm underpinning this study. In the current study, the classroom/school environment is defined as the physical environment, policies, practices, as well as the relationships and the interactions between different participants around content, teaching, and learning (Opdenakker & Damme, 2007). For many public schools, curriculum reform goals and raising standards of content and performance have sparked fierce debates and increased pressures of high-stakes accountability, graduation requirements, prescriptive curriculum, and strengthening accountability with less autonomy for teachers (Abrams, Pedulla, & Madaus, 2003; Harrison-Jones, 2007; Opdenakker & Damme, 2001; Opdenakker & Damme, 2007).

Good understanding of the influence of classroom/school environment on teaching and learning was important to the current study because it discloses some of the factors teachers face when implementing curriculum reform within schools. Although there are many factors that influences a classroom/school's environment, the primary focus of this part of the literature was to review relevant areas of high-accountability, school composition, school processes, and specific factors of an orderly school environment as they intersect with students' mathematics achievement, curriculum reform, and equity. A further analysis of the classroom/school environment was also vital to gaining greater insight into teachers who find success implementing CCSSM.

Impact of High-stakes Accountability

More schools are operating in environments of increased pressures of high-stakes accountability. High-stakes accountability describes a climate experienced by educators due to the implementation of NCLB legislation that have revealed increased, intensified, and expanded pressures in response to federal, state, and local policies aimed at raising student achievement (Valli & Buese, 2007, p. 520). Some scholars have analyzed the pressures teachers face, focusing more on preparing students for high-stakes testing above curriculum expectations (Abrams, Pedulla, & Madaus, 2003; Harrison-Jones, 2007). Various scholars discussed the need for changes in school compositions and practices as a means of impacting ethnically diverse students' achievement (Abrams, Pedulla, & Madaus, 2003; Boonen et al., 2014; Harrison-Jones, 2007; Opdenakker and Damme, 2007; Valli & Buese, 2007).

Consequently, a lasting effect of the NCLB legislation is the implementation of high-stakes accountability. High-stakes testing, according to Harrison-Jones (2007), describes the practice used by educators to make decisions concerning a student's progress based on the results of a standardized assessment score. This research argued whether the high-stakes accountability implemented under NCLB has actually added to the anticipated changes of better teaching and learning, engaged students more, or increased graduation rates (Harrison-Jones, 2007). Scholars further contended NCLB served as a driving force to find more effective programs and practices for low-performing schools (Fleischman & Heppen, 2009). Moreover, Fleischman and Heppen (2009) observed the challenges of low mathematics achievement, the growing number of English-language learners, the school environment and lack of effective teachers in the neediest schools influenced effective implementation of school reform. According to Harrison-Jones (2007), many educators agreed with the proposals of NCLB legislation's efforts to improve schools; however, there was much caution of the negative consequences surrounding high-stakes accountability.

High-stakes Testing and Teachers' Practice

Various scholars documenting the influences of high-stakes accountability environments on the teaching practice opposed the implementation of content standards (Abrams et al., 2003; Au, 2007; Diamond, 2007). Their research indicated teachers' views were generally positive about the state content standards (Abrams et al., 2003; Au, 2007; Diamond, 2007). Nevertheless, Abrams et al. (2003) found teachers "reported the state test has led them to teach in ways that contradict their own notions of sound

educational practice" (p. 27). Abrams et al., further suggested high-stakes accountability environments had a significant impact on the teachers' instructional practices. Moreover, these teachers were more likely to focus instruction on the content assessed, rather than enrichment activities (Abrams et al., 2003; Au, 2007). Abrams et al., concluded teaching practices were influenced more by state test rather than content standards. This research found teachers in high-stakes testing environments felt pressured to improve student performance on state tests from superintendents, principals and parents.

School Composition and School Processes

In addition to the influence of high-stakes accountability on curriculum reform, researchers have investigated the influence of a school's composition and processes on students' mathematics achievement. Opdenakker and Damme (2007) investigated the relationships between school composition, school context, and school practices on teaching and learning. Opdenakker and Damme described school composition factors such as characteristics of the student population, (e.g., school ability, SES, heterogeneity) the teaching team, and the school's leadership. The school practices were described as the functions of the educational framework, the school's organization and management practices as well as the work and learning climate. They described the context as the school's background, including descriptive characteristics of the geography, location, parent participation and the physical characteristics such as school size, programs offered and the school's facilities. This research found significant relationships existed between school characteristics that may explain differences in the mathematics achievement of

some schools. More specifically, student composition was found to be very important for school practice and school outcomes.

Racial Composition and Mathematics Achievement

Various other research also found similar classroom/school environmental variables impacting students' learning and engagement in mathematics, including organization, racial composition, prior mathematics achievement and school personnel (Boonen et al., 2014; Opdenakker & Damme, 2001). Boonen et al. (2014) investigated the importance of the school's composition on the mathematics achievements of minority students also using a quantitative analysis. This study found a significantly positive association between students' prior mathematics achievement and school composition for high achievers, but not medium and low learners. Additionally, Boonen et al. (2014) found statistically significant associations between the percentage of minority students in a school and the mathematics achievement of Hispanic American students. Their research suggested the composition of a school is important to the mathematics achievement for Hispanic American students.

Reys, Scribner, and Scribner (2001) also found the racial composition of the school and staff impacted students' academic success. Their review of studies examining high-performing schools with large populations of Hispanic American students found Hispanic American students did far better in mathematics when taught by Hispanic American teachers. This research also concluded that such schools found success creating learning environments that were responsive to the cultural and linguistic needs of these students while challenging them academically.

Teacher Cooperation

In addition, Opdenakker and Damme (2007) indicated the cooperation between teachers is strongly connected to the classroom/school's environment process, and the academic achievement of students. When schools concentrate on building collaborative communities focused on establishing relationships and common goals centered on learning, the capacity of the school increases as well as the potential for success (Bezzina, 2006). Whereas Bezzina (2006) argued building collegial relationships can be challenging, these relationships can be powerful tools to change teaching and learning, to resolve conflict and to provide opportunities to assume leadership and responsibilities. Data collected from 84 teachers indicated the principals and other teachers were most influential on teachers' practice (Diamond, 2007). Although Diamond's (2007) research indicated principals and teaching colleagues influenced teachers' practices, this research also found the influence was often associated with accountability policies surrounding teaching and learning.

Opdenakker and Damme (2007) further contended teacher cooperation was strongly related to the cognitive level of students and the school size. Their research suggested teachers were more apt to build collaborative relationships out of the need to support students' cognitive goals. Other scholars indicated collaboration among teachers provided them opportunities to develop their skills and understanding over time, resulting in significant increases in students' progress (Schoenfeld, 2002).

Orderly Learning Environment

Considerable research found an orderly learning environment is an important process to a students' academic achievement (Hanselman, Bruch, Gamoran, & Borman, 2014; Hoy, Tarter, & Hoy, 2006; Ruus, Veisson, Leino, Loone, Pallas, Sarv, & Veisson, 2007). According to Ruus et al. (2007), an obligation of schools is to create a climate that encourages students to "perceive learning tasks as challenging and opportunities for self-improvement" while being supported by their teachers (p. 932). Some scholars suggested a school's academic achievement is often attributed to the order of the learning environment or the academic emphasis, goals and quest of the school (Hoy et al., 2006).

Hoy et al. (2006) found when schools focused on academic excellence rather than behavior, greater academic performance is realized. Moreover, the school community inclusively, comes to value achievement. Hoy et al. (2006) contends, "efficacy, trust, and academic emphasis produce a powerful synergism that motivates, creates optimism, and channels behaviors toward the accomplishment of high academic goals" (p. 440). Hanselman et al. (2014) contended social psychological interventions are one way to improve the inequalities in certain schools. For example, they suggested some of the negative consequences of schools should address self-affirmation. These scholars suggested schools that are effective in producing positive student behavior are more effective in achieving academic success (Hanselman et al., 2014; Hoy et al., 2006; Ruus et al., 2007).

Summary

This review of the literature focused on investigating the scholarly research impacting this study's conceptual framework. In respect to standard-based curriculum reform, researchers revealed both challenges and successes for teachers (Drake & Sherin, 2006; Manouchehri & Goodman, 2000; Remillard & Bryans, 2004). Some studies cautioned for more awareness of teachers' perceptions and beliefs as they implement curriculum reform, particularly with minority students (Darling-Hammond, 2000; Drake & Sherin, 2006; Gay, 2013; Manouchehri & Goodman, 2000). Other research indicated many teachers lack the possible skills to support students effectively and oftentimes "neither the curricula nor the work conditions…provide opportunities for professional growth" (Schoenfeld, 2002, p. 22).

While CCSSM proposes specific strategies to support the challenges teachers might face during implementation, researchers recommended teachers pay close attention to the cultural needs of minority students (Darling-Hammond, 2000; Gay, 2013; Hand, 2012; Howard, 2003; Lewis, 2007; Lubienski, 2002a; Lubienski, 2002b). This literature review also advised educators to examine the environment, composition, and practices of schools (Opdenakker & Damme, 2001; Opdenakker & Damme, 2007; Schoenfeld, 2002).

Nevertheless, researchers argued the only ways for public schools to survive is to undergo disruptive changes in the systems that define how schools and those who work in them go about their tasks (Schlechty, 2005, p. 234). Some scholars argued urban school change, such as curriculum reform, is more likely to fail than succeed (Boonen et al., 2014). However, this literature review revealed there is a large body of evidence to

support standards-based curriculum reform as a means to improve student achievement for all students. Schoenfeld's (2002) analysis of elementary students' performance on standard-based curriculum indicated that in schools with weak or little evidence of implementation of reform, European American students met standards by a ratio of four to one for African American students. However, schools with strong evidence of implementation of standards-based reform found an increase in the percent of African American students performing well on problem solving and concepts (Schoenfeld, 2002). To that end, educators should assume holding high expectations for all students is critical, but not sufficient to create equitable classrooms (Lubienski, 2002a). Chapter 3 will discuss the research design and methodology used to conduct the dissertation research.

Chapter III

RESEARCH AND METHODOLOGY

The current research investigated the persistent achievement gap existing in school communities with dominant populations of African American and Hispanic American students and school communities where the dominant populations are European American and Asian American students. According to McKown (2013), the way policy makers, practitioners, and the public verbalize the cause of the "Black-White" achievement gap will impact what is done or not done to solve the problem (p. 1121). This study' contributes to the literature focused on the experiences successful teachers of African American and Hispanic American students utilize while implementing CCSSM. To achieve this goal, this study employed qualitative research methods. Utilizing interviews and documents, I collected multiple sources of data from teachers as they enacted CCSSM.

The goals of the current study were to compare multiple data sets to arrive at a credible interpretation of events and interactions (Merriam, 2009). Drawing from personal experiences working with teachers in mathematics and curriculum development, I sought to understand and make meaning of teachers' experiences with a goal of linking research to practice. The following research questions guided this study:

RQ1: What are the common practices used by teachers who find success implementing CCSSM with African American and Hispanic American students?

RQ2: What aspects of the classroom/school environment impact the common practices of teachers who find success implementing CCSSM with African American and Hispanic American students?

Research Design

Due to teachers' unique experiences, this study was implemented using qualitative research established in the interpretivist theory. The primary goal of this study was to understand and describe the distinctive meanings of successful teacher models in the context of their school environments. The interpretive research approach allowed meaning to be constructed and interpreted throughout the process of collecting data and engaging with teachers in their environments (Merriam & Associates, 2002). According to Merriam & Associates (2002*),* qualitative researchers seek to understand (1) how individuals interpret their experiences, (2) how they create their world, and (3) what sense they make of these experiences (Merriam, 2009). Similarly, the purpose of the first research question in this study was to develop an understanding of how teachers who find success interpret and make meaning of their experiences implementing CCSSM while working with minority students.

The second research question sought to understand aspects of the classroom/school environment, which may also influence the implementation of CCSSM. Particular to basic interpretive research is the examination of social inequalities which suggest that schools focus on ways to support lower socioeconomic students' connections between gaps in their skills and the demands of society and school (Pai & Adler, 2001).

This perspective requires one to understand the significance of the schooling-society relationship by interpreting the meanings of interactive patterns among these groups, curricula and school achievement (Pai & Adler, 2001).

According to Merriam (2009), reoccurring patterns or themes are derived from and supported by the data in basic qualitative research. As such, a primary goal of basic qualitative research is to uncover and make meaning of the experiences (Merriam, 2009). To this end, results of this study show common practices among successful teacher models within the context of their school environments.

Constructivism is the central theoretical perspective that underlies basic qualitative research (Merriam, 2009). According to Merriam (2009), meaning is not uncovered but constructed, as individuals interact within this social world. In a similar way, this research sought to understand how teachers who find success construct meaning as they engage with CCSSM within the context of their school environments. Phenomenology and symbolic interactionism are the two interactions that inform basic qualitative research (Merriam & Associates, 2002). The idea that individuals interpret their day-to-day experiences based on the meaning it has for them is found in phenomenological interactions. Phenomenologists seek to gain entry and understand what meaning people construct around their daily lives. Researchers employing symbolic interactionism focus on constructing meaning from the interactions of individuals in the context of the larger society (Merriam & Associates, 2002). As a result, this study drew from both phenomenology and symbolic interactionism to understand how teachers, who find success, make sense of their experiences with curriculum implementation.

The basic qualitative design was best suited because the purpose of this study was to understand how teachers make sense of their practice and experiences, whereas other qualitative methods have additional goals (Merriam & Associates, 2002; Merriam, 2009; Patton, 2002). Although basic interpretive research draws from phenomenological interactions, a phenomenological study has additional goals of understanding the "essence and underlying structure of the phenomenon" (Merriam and Associates, 2002, p. 38). Therefore, basic interpretive qualitative research was most appropriate for this research. Also underpinning this study are my personal interest and work with curriculum reform, an understanding of the literature on standards-based curriculum reform, the use of equity, and the school environment's impact on the mathematics achievement of minority students.

Site and Participant Selection

Teachers were recruited to participate in this study from among seven middle schools within two learning communities in an urban school district in the southeastern part of the United States. Geographically, this school district is organized by learning communities, allowing for schools to work closely together to align resources using a decentralized approached to management. Since learning communities align schools, it allowed easier access to explore contacts and recruit teachers through email and personal contact (see Appendix A). The section of the participating school district where African American and Hispanic American students make up the majority population of the student body within the selected learning communities was chosen for this study. The schools selected for this study represent good choices for examining teacher success

models in schools where standardize test results are consistently lower than both their district and state results. Participants in this study represent three of the seven schools.

Purposeful sampling procedure was used to identify individuals from within the chosen schools who sufficiently represent the intensity of successful teacher models, but were not an extreme case (Patton, 2002). Important to purposeful sampling is the involvement of some prior knowledge and considerable judgment, to seek a sample of teachers who adequately represent good models of CCSSM implementation. Therefore, I utilized professional relationships developed with teachers and administrators within these learning communities over the past 18 years. Nominations were sought of individuals who represented successful models for this research. I sought school leadership input for nominations.

The following criteria were used and shared with school leaders and teachers to select participants who possess adequate information: (1) have 2 years teaching experience with CCSSM, (2) have a reputation within the school among leaders and colleagues as being an individual who is successful implementing CCSSM, (3) self-identified commitment to students' success, (4) standardized-tests results are comparative to district and state results for African American and Hispanic American students, and (5) more than 60% of the students are instructed in an on-level mathematics course. Selecting a sample size of five teachers as successful models provided an ample size to explore the nature of variation among participants (Patton, 2002).

According to Seidman (2006), succfieciency and saturation are important criteria to determine if the number of participants are enough. Sufficiency refers to having

enough participants to "reflect range of participants and sites that make up the population so that others outside the sample might have a chance to connect to the experiences of those in it" (Seidman, 2006, p. 55). Seidman referred to saturation as the process in which, the researcher is no longer gaining new knowledge because the same information is being conveyed.

The selection criteria allowed for a sample of five teachers with an understanding of the CCSSM and demonstrated this knowledge in both collegial and individual perceptions. At the time of this study, CCSSM was in its third year of implementation. Therefore, teachers in this study were teaching CCSSM since the onset of its implementation in their school district. These criteria provided individuals with a good understanding of the curriculum.

By selecting teachers who instructed students in on-level mathematics courses, it allowed me to understand the classroom instructional practices of teachers with students identified at the same academic level. Teachers were purposefully sought and identified through reputation, word of mouth, and referrals. Table 1 summarizes demographic and selection profiles of the five successful teacher models selected for this research. The recent state and district assessment scores summarize the middle school results for both African American and Hispanic American students.

Table 1

Successful Teacher Models Selection Profiles

Pseudonym	Gender	Years in Education	2014 Results Meets/ Exceed All	2014 State Results Meets/ Exceeds AA	2014 State Results Meets/ Exceeds H	2014 District Results Meets/ Exceeds AA	2014 District Results Meets/ Exceeds H
Belinda	F	20	91%	83%	88%	85%	91%
Gary	M	3	93%	83%	88%	85%	91%
Karen	F	8	89%	83%	88%	85%	91%
Norman	M	15	85%	83%	88%	85%	91%
Toni	F	6	87%	83%	88%	85%	91%

Note. AA = African America; H = Hispanic.

Researcher Relationship

As the researcher, my primary role was that of an observer. Patton (2002) defined the researcher as the instrument. He suggested, in qualitative research, that the role depends largely on the skills and competence of the researcher. Therefore, in order to establish a more collegial relationship, I informed the participants of my role as a mathematics instructional coach. I introduced myself as a full time mathematics instructional coach and a part-time doctorate student. I utilized my knowledge and skills developed in my role as a mathematics instructional coach and my work with mathematics curriculum reform as an important analytical lens for both data collection and data analysis.

My connection to this study is closely linked with my work as a mathematics educator. I have spent many hours in the classroom working with teachers performing

observations and providing support to improve classroom instruction. Therefore, it was important for me to consider the knowledge and the biases that I bring to this research. Also my beliefs about teaching and learning mathematics include preconceived bias that may have influenced my thinking regarding this research.

Data Collection

A combination of interviews and documents were used to gain an understanding of the common practices and experiences of teachers who find success implementing CCSSM with African American and Hispanic students. These sources of data each provided a unique layer of information to support the study. Checking the strengths and limitations of these different sources against one another was a means to support the conclusions drawn from the data collected (Maxwell, 2013). Additionally, utilizing multiple methods in data collection offered a means to cross check findings, thus strengthening and validating the study (Patton, 2002). The process of managing and collecting data occurred simultaneously throughout the research study.

Teacher Interviews

The primary means of data collection was audiotaped (and transcribed) semi-structured interviews. This study endeavored to understand the common practices and experiences of teachers who find success implementing CCSSM. Seidman's (2006) three-interview structure provided a format that allowed a more in-depth understanding of the participants' life history, their current experiences as a teacher and reflections on the meanings of their experiences and practice. While this process provided information on the participants' background and professional knowledge, the primary focus of the

interviews was to gain a deeper understanding of teachers' experiences and motivations implementing CCSSM. The interviews were conducted at each participant's school site and each of the first two interviews lasted approximately 45 minutes. Adjustments in schedules were made as needed to meet and accommodate the needs of the participants.

The first interview provided background information about each participant. The goal of this interview was to provide a context about teachers' beliefs and practices. The second interview was scheduled and conducted within a time frame between 1 and 2 weeks. This interview focused mainly on developing an understanding of the teachers' experiences enacting CCSSM. Understanding the meaning individuals make of their experience is particular to basic qualitative research (Merriam, 2009; Merriam & Associates, 2002). After each interview was conducted, I used an audiotape to journal my own personal reflections about each experience and took care to transcribe each interview as immediate as a few hours to no more than a few days.

I utilized member checking after the first two interviews by providing my participants transcribed copies of my interviews in order to rule out the "possibility of misinterpreting the meaning…perspectives they have on what is going on" (Maxwell, 2013, p. 126). Thus, the third interview only resulted as needed from an analysis, reflection, and preliminary interpretation of the transcription of the preceding interviews. The researcher used Seidman's (2006) interviewing guidelines to develop the interview-structure (see Appendix B). Seidman suggested each interview provide a basis of information and help illuminate the next. My goal was to gain an insight into the teachers' meaning and reflection about their practice and implementation of CCSSM.

Curriculum Documents

Relevant to the theoretical framework of this research are teachers' orientation and enactment of CCSSM. Thus, documents that are relevant to teachers' experiences with CCSSM were significant sources of data collected in this study. According to Merriam (2009), documents can reflect the beliefs, attitudes and perceptions of participants and are a reliable source of data.

For documents collection, teachers were asked to provide artifacts demonstrating how they implement tasks in their mathematics instruction. Teachers were asked to complete a cover sheet (see Appendix C) identifying the task or tasks students were asked to complete, directions to the students and the expectations for students' work. Teachers were also asked to provide copies of any rubrics, criteria sheets or scoring guides. These artifacts were used as a means to verify information shared in interviews. In most cases, artifacts were collected during the second interview. This gave teachers time to select documents they felt represented their implementation of CCSM. All participants provided documents either in person or by electronic email. Sample curriculum tasks provided additional data to support the development and understanding of the classroom practices that exist with teachers' implementation of CCSSM. These artifacts were analyzed using a constant comparative analysis on a single case and across cases.

Data Management

Data collection was maintained using both digital form (i.e., digital recordings, and Microsoft word documents) and paper form (i.e., surveys and interview transcripts). Interviews were recorded using a cell phone application and uploaded into a transcription

program and manually transcribed. Using a mix of manual and computer management systems allowed me to maintain both hard and soft copies throughout the research. Coding was assigned to each interview and document (i.e., pseudo name, data type, data type number, date collected). I utilized both digital and manual methods of keeping memos throughout the research process. I coded the memos by researcher's name, date, time, and topic. An electronic copy of data was kept, which includes the organization scheme, separate from the working data sets. In addition, hard copies of files for each participant were maintained throughout the process as data were transcribed, coded and analyzed.

Methods of Analysis

The process of analyzing data in qualitative research is parallel with data collection and usually begins with the first interview and documents accessed (Merriam, 2009; Merriam & Associates, 2002). I made sure to manage the process of collecting and analyzing data immediately and simultaneously while allowing the process to emerge as the study was conducted. The primary goal of data analysis was to make sense of or make meaning of the data. Merriam (2009) suggests the task of data analysis should involve "looking for recurring regularities" by comparing one unit of data with the next (p. 177). Data analysis was ongoing throughout the study and deductive to identify themes, patterns, and questions. Interacting with data through personal transcription and hand coding allowed me to see patterns and categories more readily.

According to Merriam (2009), in a basic interpretive qualitative research design data is analyzed through identifying recurring patterns or themes using a constant

comparative method (Merriam, 2009). The step-by-step process of analyzing data included category construction; sorting categories and data; and developing more theoretical themes. The first step begins during transcription of the interviews and documents. I began looking for recurring regularities in the data. The convergence process included taking the raw data from each transcription of each set of interviews and documents and making notations next to small pieces of data that seemed useful in answering the research questions. This type of notation was the beginning of coding and is generally referred to as open codes early in the procedure (Merriam, 2009). Categories from the transcriptions of the first interviews were compared to the transcriptions of the second set of interviews. This process was highly inductive and repeated again and again throughout the research as each piece of data was reviewed.

The second step in the data analysis process included both inductive and deductive checking categories with other data sets. In the initial process these categories contained many individual pieces of data or elements. Merriam (2009) argued the aim is to construct categories that capture a reoccurring pattern or patterns across data sets. In a constant comparative data analysis process, I checked the categories from one interview with another interview keeping some categories while eliminating others. I repeated the same process with document analysis.

The next step in the data analysis process involved the naming of the categories and the development of more theoretical themes. The names of categories in this research were constructed from my observation of the participants, my understanding of the data analysis, and from the literature unpinning this study. According to Merriam

(2009), there is a "period of intensive analysis when tentative findings are substantiated, revised and reconfigured" (p. 178). This period is defined by a continual analysis of the categories in an effort to link the conceptual elements of the study. Merriam (2009) contended this is a time to develop a more intense understanding of the phenomenon. Therefore, I looked for and developed the theoretical categories by examining the core meaning of the content.

A matrix was used for comparison across interviews and documents to deluge the context of the data. Matrices served as tools to see respondents' quotes from interviews and were compared across cases using the existing research to support the development of themes. The data and the matrices were reviewed to further determine the core meaning and the significance of the data. Ongoing data analysis allowed me to determine when the data became 'saturated' or the point where no new insights were discovered (Merriam, 2009). This intense period of comparative analysis of multiple data sources also helped me to determine common practices used by teachers who have found success in implementing CCSSM as well as describe their experiences.

Trustworthiness

In order to circumvent possible threats and to test the validity of conclusions, triangulation, member checks, feedback, and rich descriptive data analysis were employed. Collecting data through multiple methods and across cases to provide triangulation and thereby strengthen the study supported the trustworthiness of this study. Because I was "the primary instrument of data collection and analysis in qualitative research," according to Merriam (2009) using multiple methods of data collection like

interviews can be verified against what I observed at the participants' site and what is read in the literature relevant to this phenomenon of interest (p. 214). As data was collected, feedback was solicited from key members of my research committee and participants when forming generalizations about the data. Participants were provided copies of the transcriptions of interviews as a means of member checking throughout the process. This gave participants the opportunity to discuss the findings and provide relevant feedback.

Finally, the qualitative aspects of this study supported the use of rich descriptive data. While examining data, I looked for alternative explanations and counter explanations of evidence. According to Merriam (2009), to enhance the possibility of the results of a qualitative study transferring to another setting, I used "highly descriptive," explanations of the findings and adequate evidence presented in the form of quotes from participant interviews, field notes and documents (p. 227). The conceptual framework found in the literature underpinning this study also heavily supports this research. Therefore, comparing the research findings with the existing literature was important to supporting the trustworthiness of this study. These methods and others assisted in controlling validity threats to my research conclusions.

Ethical Issues

Merriam (2009) warned part of ensuring the trustworthiness of a study is the credibility of the researcher carrying out the study in an ethical manner. I addressed this ethical standpoint by making my participants aware of possible harms, or lack thereof, associated with the study. No participants were subject to any illegal or unethical

activities while participating in this study about common practices of teachers who find success-implementing CCSSM with African American and Hispanic American students. In accordance with the guidelines of Valdosta State University (VSU) regarding the protection of human participants, a request for a review was submitted to the VSU Institutional Review Board (IRB) for approval to interview approximately five to seven participants for this study.

After receiving Institutional Review Board approval, participant recruitment and data collection began. Upon initial contact, the research participants were provided with a copy of the VSU IRB consent statement for anonymous survey research (see Appendix I). The interview and document collection process that was used to complete the data-collection was explained to participants. Although potential harm was not foreseen with regards to this study, all participants in this study were made aware of possible harms, or lack thereof, associated with this study. Pseudonyms were assigned to the teachers and their schools to protect the identity of the participants and location of this study. Also participants were provided with a copy of the abstract and Institutional Review Board approval documents for this study as a means of ensuring full disclosure to teachers before they provided informed consent for interviews, and documents. I maintained possession of all collected data and managed its security by storing it with electronic and manual keys that were only accessible to me.

Summary

This study was implemented using basic interpretive qualitative research methods to investigate common practices utilized by successful teacher models of African

American and Hispanic American students while implementing CCSSM. Five participants were selected to participate in this study using purposeful sampling. Data was collected through a series of interviews and documents. Data was analyzed using a comparative cross case analysis. This study employed multiple data collection sources, member checks, feedback, and rich descriptive data analysis to support the trustworthiness and the validity of the research. To avoid any ethical concerns, personal biases were established and all guidelines were followed according VSU IRB protections of human rights for conducting research. In the next chapter, I present the themes and patterns that derived from my analysis of the data collected from the five successful teacher models.

Chapter VI

RESULTS

The purpose of this study was to investigate the common practices utilized by teachers of African American and Hispanic American students who find success while implementing CCSSM. This chapter, grounded in data, examines the practices used by five successful teacher models to determine factors influencing their success implementing CCSSM. I also sought to understand the aspects of the classroom/school environment that influenced their common practices. This chapter describes how the data was examined across multiple cases, allowing interpretation to evolve as new cases were examined, rather than attempting to apply a pre-given interpretation in particular cases. The following research questions guided this study:

RQ1: What are the common practices used by teachers who find success implementing CCSSM with African American and Hispanic American students?

RQ2: What aspects of the classroom/school environment influence the common practices of teachers who find success implementing CCSSM with African American and Hispanic American students?

In this chapter, I present a brief narrative of the participants to provide background information on their educational experiences as well their context in this study. Then, I present each theme as it relates to answering the two research questions

using the participants' quotes as evidence of my findings. I made edits to the participants' transcripts when necessary in order to maintain coherent flow throughout the findings. Although these edits included adding or deleting word(s), it did not compromise the thoughts and intents of the participants. In conclusion, I summarized the important findings and themes from this research.

The data collection and analysis process of this research was conducted over a period of 6 months (May through October, 2015). The purposeful sampling procedure was used to select participants from a population of seven math teachers in seven middle schools from a large metropolitan school district in Georgia. First, an initial email was sent to the administrators of these seven schools to survey their interest in participating in this study. Only three schools indicated support of the study. I reached out to participants from these three schools based on the administrator's recommendations of teachers and/or contacts to find these successful teacher models. Five participants were then selected to participate in this study based on the selection criteria set for this study. Two participants were not selected to participate based on the criteria outlined in this study. These participants were eliminated because they were not teaching on-level students for at least 60% of their instructional time.

The five math teachers were selected to participate in this study based on their professional reputations of successful practices in their schools, with African American and Hispanic American students, implementing CCSSM for 3 years. They had recent assessment results comparable to their districts' and state results. Sixty percent of the courses they instructed were coded as on-level. They also shared a self-identified

commitment to their students' success. The following are pseudo names and have no special significance. Table 2 summarizes the participants' demographics profiles.

Table 2

Participants' Demographics Profiles

Pseudonym	Gender	Ethnicity	Years in Education	Grade-Level	Education	Pseudonym School
Belinda	F	AA	20	8th	Specialists	Union MS
Gary	M	AA	3	7th	Masters	Union MS
Karen	F	AA	8	7th	Masters	Prime MS
Norman	M	AA	15	6th	Masters	West MS
Toni	F	AA	6	8th	Masters	Prime MS

Note. AA = African American; F = Female; M = Male

Brief Narrative of Participants

Belinda

Belinda was recommended by her assistant principal to participate in this study. She had the most teaching experience among the five participants. During the time of this study, she was completing 20 years as an educator. She also held the highest degree among the participants with a Specialist in Educational Leadership. Belinda was the only participant who attended college outside of the United States for her bachelors' degree.

I met Belinda 4 years earlier at a professional development workshop on curriculum implementation I was conducting. I recall even then she had a reserve nature. After explaining the purpose of this study and obtaining verbal consent to participate, the first interview was conducted on May 11, 2015 at her school. This interview was conducted in a mathematics planning room with a large conference table and information about Common Core mathematics was displayed around the room. Belinda's eyes

continually scanned the room as she thought deeply about the questions I was asking. Additionally, her tone of voice showed confidence in her responses, although she had a quiet nature.

Belinda described her path to teaching as a default to her first choice of working as a computer programmer. She stated, "I had no plans in college to become an educator." She essentially became a teacher because of a personal connection with a principal who knew her family and offered her a job to teach computer skills to high school students. While she accepted, she was not able to conceal her certification in mathematics. She described how she became a mathematics teacher 3 years after first accepting a job as a high school computer teacher. She responded with a chuckle, "Of course mathematics teachers are in demand and that's how I became a mathematics teacher."

Although Belinda was a teacher leader at her school and served in the role of Mathematics Contact, her reaction indicated a sense of concern that she still had goals to accomplish. As a result, Belinda discussed her greatest disappointments in her career.

> I feel like there is much more that I can do to impact students and I haven't done that yet. Not to say that I am still not going to do it, but I haven't done that yet. My greatest disappoint is that I haven't done more.

While conducting the second interview at Belinda's school on May 27, 2015, I observed displays of students' work present in her classroom. Belinda's professional and quiet tone was still present as many of her responses focused on students. Her demeanor exhibited passion as she spoke of them. While engaged in dialogue about what she felt

empowered by, she stated, "When I actually see the faces and the lights go off for what I am trying to portray to them. When I get feedback that says yes, they have gotten it and I know they have gotten it."

In a similar manner, she continued to focus on her students as I asked about what discouraged her implementation of CCSSM. She stated, "My students again, it's all about my students. When they are confused about so many different things. It discourages me when they are struggling so much with what is being asked of them." Her views about her students' success are exemplified by Lewis' (2007) research on equity. He contends that when teachers are purposeful about changing their convictions about minority students, they show gains in achievement.

Gary

Gary was the youngest of the five participants. He completed a double master's degree in health administration and public health. Although Gary knew he always wanted to teach, he shared, "I just didn't know how soon I would enter the profession." Gary entered teaching through a rigorous alternative teaching certification program due to his college background in science. He described his alternative certification program as "focused on academic excellence for students." Gary discussed his work supporting and tutoring students throughout his college career with great enthusiasm. He shared that his work tutoring and mentoring high school students in mathematics and science both in college and community organizations had always been a passion for him.

His principal and instructional coach recommended Gary to me. I met Gary at a district-wide professional development 4 years prior to conducting this study. After

explaining the purpose of this study and obtaining his verbal consent to participate, I interviewed Gary at his school on May 20, 2015 and again on June 4, 2014. Gary was rather tall, slender and dressed in a business casual shirt and slacks. While interviewing Gary in his classroom, I observed evidence of real-world connections to mathematics reflected in his teaching space. Gary's game theme spread throughout his classroom and connected basketball representations to mathematical proportions and board-games of scrabble were turned into mathematical word walls. These displays illustrated abstract ideas of mathematics placed in a real-world context. This is similar to the complex nature that came across in his interviews.

Gary showed a deep reflective level of thought and a cognitive awareness in his responses during the interviews, as he explained what he valued most about CCSSM.

> That's a loaded question. Since I am a fairly young new teacher, Common Core was being rolled out in my first year. When I conducted my student teaching, we were actually implementing the Georgia Performance Standards…I would say it has stretched me in ways I didn't know I could be stretched. It has made me alter some of my teaching practices. How am I going to teach this? How am I going to convey this to the kids? It pushed me out of my comfort zone as well as the students. Take for example, the construct of adding integers or rational numbers. Common Core wants you to be able to model these things. Students are expected to explain the reasoning behind these concepts. They are expected to explain the reasoning behind why these algorithms work. It propels the students to think on a different level. Common Core includes the rigor they will need for the real

> world, but it challenges them to be assured of why they are doing math. For instance, when I was in school [student] you did math because the teacher told you what to do. There was little or no explanation to why this makes sense. Common Core not only allows students to learn the materials, but to apply it in different ways and think about the rationale for why these things make sense, or why this algorithm work and what's the basis behind this information.

Echoing the challenges indicated by Gary's reflective response, Manouchehri and Goodman's (2000) research indicated a teacher's mathematical knowledge influences ones' planning of instruction and engagement of students with curriculum materials. His thoughts about being pushed out of his comfort zone are exemplified in Remillard and Bryans' (2004) research indicating teachers in the development of pedagogical change began to think differently about mathematics teaching and learning.

Karen

At the time of this study, Karen had 8 years of teaching experience. Her principal and mathematics instructional coach recommended Karen. Like Gary, Karen came from a family of educators. She wanted to be an educator, but consciously decided on a different career. According to Karen, "that's what everyone expected of me." Similar to Belinda, she also wanted to be a computer programmer. Unable to ignore her inner desires, she entered education as a second career. She holds a master's degree in middle grades education and an instructional coaching endorsement from the state of Georgia.

I first met Karen 5 years earlier, while she was participating in a teacher leader grant partnership between a local university and the school district. I recall even then she

was motivated and had a self-reflective nature. For this study, I interviewed Karen afterschool on August 5, 2015 and again on August 12, 2015. On both occasions, she displayed a very focused and thoughtful persona. During our second interview, I waited for the students to be dismissed for the school day. This gave me the opportunity to observe Karen going about her normal routines of moving students to their correct location with an authoritative command. She was calm, but commanding and students responded in a positive manner to her request. She was focused on the work at hand and moved from directing students to their afterschool destinations to our interview.

During the time of the interview process, Karen was also a teacher leader in her school. She served as Mathematics Contact in her school, supporting teachers with mathematics instruction. Her interviews revealed delight for her work as a teacher leader. Karen's appearance and voice tone became passionate when she spoke of the teachers she collaborated with. In addition, Karen's response exhibited evidence that students were at the center of their work.

> The teachers I plan with are on the same page. We all want to see the success, we all work hard, but we work together. We all celebrate successes together we re-strategize when there is not as much success as we desire. We set goals, we set passing rates, but we are also realistic. We set them at A, but we understand that where the kids came from and where they are that we may have to accept 70% at that moment. We go back and keep spiraling it in to help them get higher.

The academic achievement of students demonstrated in Karen's collaboration with her colleagues' supports Opdenakker and Damme's (2007) view that the cooperation

between teachers is strongly connected to the classroom/school's environmental processes.

Moreover, Karen's leadership in the process of building collaborative communities also coincides with Bezzina's (2006) claim that establishing relationships and common goals centered on learning increases the capacity of the school and the potential for success. Like Karen's roles, Bezzina (2006) argued that although building collegial relationships can be challenging, these interactions could influence changes in teaching and learning and provide opportunities to assume leadership and responsibilities. Karen demonstrated a nurturing and caring side of her persona towards her students at the end of her second interview. She posed the following questions, "What happens to the students whose teachers don't take the time to make sure they have the foundations?" and "What happens to the students whose teachers don't care to see their success?"

Norman

Norman was recommended by his assistant principal to participate in this study. During the time of this study, Norman and I had attended several of the same district led meetings and professional developments for more than 10 years. These encounters revealed his commitment to professional growth and development. I interviewed Norman at his school on August 4, 2015 and on August 11, 2015. We met for the first interview in an office space shared by Norman and one of his colleagues. Norman was dressed in a polo shirt and slacks, average height with an athletic build. As we discussed how he came into the teaching field, I was reminded his appearance resembled that of a

golfer. Although teaching was his second career, at the time of this research, he had 15 years of experience. Norman also has a master's degree in middle grades education.

Prior to becoming a teacher, Norman was a real-estate agent. He decided to become a substitute teacher at his daughter's middle school when the real-estate market declined. The following anecdote neatly describes his motivation to become a teacher:

> My oldest daughter attended this school as a sixth grader. I heard some bad things and I heard some really good things about the school, so I wanted to see. As a real-estate agent, I played golf in the mornings and attended to real-estate appointments in the afternoon. I decided to give up some mornings to spend time at the school. As a businessman, I didn't just want to volunteer. Therefore, I got certified to become a substitute teacher. I substituted in the PE department, and even from the first day, the principal and assistant principal liked what I did.

Norman did not realize he would come to enjoy the profession and that others would see value in his work. He succinctly described his joy working as a substitute teacher, "I enjoyed being around the kids. The more I stayed, the more I found that I enjoyed it."

Norman also served as a teacher-leader in his building. He supported the teachers at his school with mathematics instruction in his role as the Mathematics Contact. According to Norman, his delight for supporting his colleagues and students gave him a sense of empowerment. He stated, "… when you become a teacher-leader and other teachers come by just to talk to you and rely on what you say, that helps you build relationships with faculty and students." When asked about the secrets to his success he

shared, "relationship building, and working hard to make myself happy with what I am doing."

Toni

Toni was recommended for this research by her mathematics instructional coach. Like Karen and Norman, Toni also became an educator as a second career choice. Prior to becoming an educator, Toni worked in the airline industry. She became motivated to pursue a career in teaching while spending time in the classrooms of her younger sons. She stated, "I realized teachers were in high demand and I enjoyed being in the classroom with my children." This decision led Toni to obtain her bachelor's degree. After completing her first year of teaching, Toni felt a masters' degree would help her to "develop more strategies to use during instruction." In 2012, Toni obtained her master's degree in curriculum and instruction.

I met Toni shortly before this in 2011, while participating in a district-level professional development on curriculum implementation. Even then, I remembered her excitement when discovering new ideas about mathematics. The interviews for this study were conducted at Toni's school on August 6, 2015 and August 13, 2015. I quickly discovered that she used her background knowledge in business as an aid to support her mathematics instructional decisions. Toni shared the following anecdote to describe her students' learning goals on a project she chose requiring them to connect their knowledge of the business world with their understanding of mathematical systems:

> Students were given two real-life situations to choose from and create a comparison model using systems of equations. Students were expected to

conduct research on their topic and use their data to create a word problem. Students were then expected to use their word problem to create a system of equations. Lastly, the students were expected to solve the system and present their findings neatly on a poster board.

Like the work Toni chose for her students, standards-based reform efforts encourage the implementation of demanding tasks as a means to support worthwhile leaning in mathematics classrooms (Clark et al., 2014; Stein & Kaufman, 2010). Though Toni used a calm and inviting tone in most of her interview responses, she displayed a passion for her work. She stated; "I love teaching math. It's one of my favorite things to do."

Discussion of Themes

I used constant comparative analysis (Merriam, 2009) across cases and data sources. This method of data analysis involved continually comparing one unit of data with another to determine similarities and differences while identifying patterns in the data. Utilizing the conceptual framework comprising curriculum reform, equity, the classroom/school environment and my personal reflections as an underpinning for this study, interviews and documents were compared for similarities and differences throughout the data collection and analysis process. The step-by-step procedure of analyzing data included initial coding and category construction; sorting categories and data; and developing more theoretical themes (Merriam, 2009). Through concurrent data analysis and a review of the literature, final themes were derived from the research questions and are the findings of this study. The themes emerged from intensive analysis

and review of audio recordings, interview transcripts, documents and personal reflections.

Interviews were conducted face-to-face using an interview protocol adapted from Seidman's (2006) three-structure interview guide (see Appendix B), and document analysis occurred throughout the data collection and analysis process. Participants were invited to review the transcriptions of the interviews and edited the transcripts to clarify meanings. Interview transcriptions and documents were compared throughout the process for similarities and differences while examining the conceptual framework of this study for evidence. The documents collected in this study were selected by the participants to represent sample artifacts of their implementation of CCSSM (see Appendix C). For example, participants' sample task illustrates Stein et al.'s (2009) claim that mathematical tasks stimulate students to make purposeful connections with important mathematical ideas, while promoting their thinking. The review of the artifacts was to help corroborate with interview data to enhance the credibility of this study. According to Merriam (2009), using multiple methods of collecting data can support checking what is stated in an interview, with what is observed on site or what is read in documents to support a phenomenon of interest. Data triangulation was used to examine interview data with my observations on site and with the teacher selected tasks. My goal was to see if methods with different strengths and limitations all support a single conclusion (Maxwell, 2013).

As I read each transcript from the interviews, data was based on the behaviors and practices identified within the participants' responses. For example, in an interview

Karen's stated, "when they [students] look at some of the standards that are aligned to Common Core they [students] already feel defeated." Since, Karen identified the challenges students would face engaging in specific standards, I coded this sentence with two different codes: CH for the challenges students encountered and RG for the rigor of standards.

I used the same process to construct codes for all data collected. When analyzing the self-identified artifacts, some codes were overlapping or duplicates. Several new codes were created. For example, Gary described the directions given to his students for the artifact he selected in the following way.

> Students were paired for this activity. A brief overview of cross-sections was given, I noted key vocabulary, like parallel and perpendicular slices. Students were also given manipulatives of geometric three-dimensional shapes with water and encouraged to use them. Play-dough and dental floss was available for students to create and cut any shapes while exploring the concepts.

Since Gary used several aspects of SMP and cooperative learning to engage his students in this task, I coded this artifact with two codes: SMP for the use of manipulatives, vocabulary development, and problem solving and CL for incorporating cooperative learning as an instructional strategy. I remained open to new codes throughout the coding process. Table 3 illustrates examples of some of the initial codes developed relating to curriculum.

Table 3

Examples of Some of the Initial Codes Used

Curriculum Codes (C)	
Code	Code Description
IM	CCSSM implementation – intended, use, engagement, and interactions
D	Dispositions– teacher's perceptions and interpretations
RG	Rigor – the level of difficulty or challenge presented by standards or education policy
CO	Coherence – consistency, clarity and soundness of standards

A matrix was constructed from the interview data based on the codes attached to the chunks or pieces of data. As I continued to review the data sets, I added groups of similarly coded chunks of data to create a category to capture the relationship of the data using the matrix. When enough data was included from each participant, categories for the chunks of data were created. Table 4 illustrates an example of the chunks of data used to create the category Student Success Encouraged Implementation.

Table 4

Example of a Category Created from Chunks of Data

Category Created based on Chunks	Sample Chunks of Data Used to Determine a Category
Teachers' curriculum implementation was motivated by their students' success	1. Seeing my students excel. Seeing students become engineers, I have doctors there are so many paths. Over the years, when I see my students go through and become what they want to in life, it is such a gratifying experience to know that I was a part of their life. (IB) 2. What encourages me is making sure that I am delivering the best instruction possible to the kids. My goal is not to fail them. To not fail them, I stick to the standards. Not just to teach the standards, but to make sure they will be well equipped for the next grade. That way progression and growth go from grade level to grade level. (IG) 3. To see the kids succeed. When they look at some of the standards that are aligned to Common Core a lot of them already feel defeated, but once I work at it with them and they work with me to see that they got it. To see that their numbers are above other numbers to see their successes. That makes me want to really do it. (IK) 4. I know I can't reach everybody, but I know I can reach a lot. I will always have a goal that I am trying to reach to get the point across and making sure that they understand it. So, I have to keep going at it. (IN)

	5. What encourages me is that I want my students to be successful. I want them to get whatever it is they need to be able to move on to the next level. What discourages me is that common core is more complex than what they are used to. So it's discouraging when I say explain to me your reasoning, show me how you got this answer. It's discouraging when they have difficulty doing that. But I am still encouraged to teach them, because I know that's what they need to be successful later on. (IT)

Note. IB = Interview with Belinda, IG = Interview with Gary, IK = Interview with Karen, IN = Interview with Karen, IN = Interview with Norman and IT = Interview with Toni.

I continued sorting and connecting categories of data, which had relationships. These categories were linked with the conceptual framework to develop the three major themes of this study (Merriam, 2009). These were: (1) views navigating CCSSM, (2) teacher/student relationships and effective learning, and (3) organizational structures drive CCSSM. Notions concerning curriculum implementation, rigor, coherence and teachers' dispositions were all grouped into one theme (views navigating CCSSM). This theme captures participants' views of the dominant influences and challenges faced while navigating CCSSM implementation. In a similar manner, teachers' effective instructional strategies, methods for connecting with students, and collaboration strategies were all linked to one theme (teacher/student relationships and effective learning). This theme examined participants' strategies used to counter the challenges of curriculum implementation with ethnically diverse students. Lastly, notions concerning student demographics, orderly environment, high stakes testing and teacher evaluation pressures were linked together into one theme (organizational structures drive CCSSM). This

theme captured participants' views of the classroom/school environmental pressures impacting their implementation of curriculum reform.

I examined the meaning of each theme to make sense of the findings. Using the cross case analysis (Merriam, 2009), teachers' experiences were compared to illustrate and connect the shared experiences of the group. Within each theme, I provide extensive participants' quotes and self-identified artifacts to enhance credibility and trustworthiness of this study. Although these themes were viewed as distinct, in many cases the concepts overlapped across themes.

Views Navigating CCSSM

It was important to investigate factors, which influenced the participants' successful implementation of CCSSM. This theme captured the participants' views of the central influences and challenges during their implementation of the standards. Throughout the interviews conducted, the five teachers in this study expressed positive orientations and shared views their student success was a central influence on their curriculum implementation. This theme focused specifically on the commonalities among the teachers' views and dispositions and addresses RQ1: What are the common practices used by teachers who find success implementing CCSSM with African American and Hispanic American students?

In reflection of the literature provided on standards-based curriculum implementation and in analyzing participants' ability to navigate CCSSM, two subthemes emerged; positive orientations and student success. All participants mainly indicated positive orientations towards the curriculum. While navigating CCSSM all participants

shared similar views that the rigor of the standards provided challenges for their students. Similarly, all participants expressed opinions their students' success drove their implementation of CCSSM. Participants' concerns echoed the scholarly research underpinning this study indicating teachers' successful implementation of curriculum reform greatly depends on the teachers' ability to engage students in meaningful mathematical experiences which require higher-order proficiencies (Remillard, 2005; Stein & Kaufman, 2010; Tarr et al., 2008).

Positive Orientations

Positive orientation towards curriculum is defined as favorable views towards mathematics teaching, learning and curriculum, as it influences their engagement and interactions with curriculum (Remillard & Bryans, 2004). One of the ways participants in this study navigated CCSSM was through their positive orientations towards the curriculum. This subtheme examined participants' dispositions towards CCSSM and its influence on students' thinking. Remillard and Bryans' (2004) found that teachers' orientation towards curriculum materials was influenced by their views of the curriculum and reflected in their sincerity to implement it with fidelity. Participants' views echoed Remillard and Bryans' (2004) claim that teachers' orientation influenced curriculum implementation whether they agreed with the goals of the reform efforts or not.

Interview data indicated that participants' ability to navigate CCSSM was influenced by their positive dispositions towards the curriculum. For some participants, this was noted in their responses for what they valued most about CCSSM. Overall, patterns revealed positive orientations towards curriculum implementation, primarily

where it focused on supporting the development of students' thinking. This exemplifies Remillard and Bryans' (2004) findings that some teachers' positive orientation towards curriculum materials helped foster students' thinking.

Additionally, the artifacts selected by teachers to represent their navigation of CCSSM also indicated knowledge about their dispositions towards curriculum reform. The implementation of tasks into mathematics instruction is important to support the development of mathematical thinking and self-regulated learning in students (Clark et al., 2014; Stein & Kaufman, 2010). All participants selected tasks which required students to go beyond typical skills like procedures for adding integers, to support their development as mathematical thinkers.

All participants discussed the emphasis of CCSSM on developing thinking and reasoning in their students and their own instructional practices. When asked how CCSSM influenced the instruction of her students Belinda shared, "I think it has helped me ... reach more students at all different levels." She found changes in her practice from implementing primarily direct instruction, to a classroom where students are learning through different means. Reflecting on this, she noted:

> I am accustomed to chalk and talk [direct instruction] and now we are doing more different things with students. I am learning from students, they are learning on their own, they are learning in small groups and with technology. They are learning from so many different media. I think I am reaching more students and they are learning on their level.

Belinda allowed her students to connect standards across the CCSSM domains of expressions, equations, and functions with her task selection (see Appendix D). The task Belinda selected to represent her implementation of CCSSM connected the real-world idea of making and selling bracelets to creating and representing equations and functions in a variety of mathematical representations. In solving several math problems, students were asked to make connections across standards and to explain and justify their answers. For example, students were asked to "Write an equation in slope intercept form for each seller to represent total earnings minus the initial investment." Responses that ask students to make connections to the real world and across content domains continue throughout this task.

Similarly, Gary revealed positive orientations towards CCSSM when asked to discuss the influence of CCSSM on his students and his instruction. His response reflected the impact CCSSM had on his students' thinking.

> Common Core challenges students to be assured of what they are doing. For instance, when I was in school you did math because the teacher told you what to do. There was little or no explanation to why this makes sense. Common Core not only allows students to learn the materials, but to apply it in different ways and think about the rationale for why these things make sense, or why this algorithm work and what's the basis behind this information. I had to push myself. So once I started pushing myself, then I begin to love getting my kids to think. Then I started getting my students to understanding the why behind certain

things. It is challenging to get them to understand the meaning behind why we are doing what we are doing.

Gary selected a task, which allowed students to explore the standards using manipulatives. He provided students with geometric solids and Play-dough as models to support their conceptual understanding. Students were asked to determine two-dimensional slices which could result from a given three-dimensional shape (see Appendix E). The goal of this activity was for students to develop an understanding of the relationships between two-dimensional and three-dimensional figures.

Although Karen found that CCSSM challenged her students' skill levels, she still found value in the applications it encouraged for students. She shared the following anecdote:

> With the implementation of Common Core, standards-based curriculum went from not just being skilled-based, but to application. When Common Core came along and shifted some of the concepts. Some kids were definitely lacking some of the real foundational things they needed to master standard. Common Core has forced me to connect some basic skills, some pre-requisite skills, and current skills together so that students can not only just know the skills, but how to apply them.

Karen's task selection allowed students to explore measuring circular objects to construct the relationship between the quotient of the circumference and diameter of a circle by examining this connection in a table (see Appendix F). Karen also provided students with examples of circular items found in the classroom to support their

conceptual understanding. The goal of Karen's task was for students to understand the relationship between the circumference and diameter of a circle as pi.

When asked how CCSSM has influenced the instruction of his students, Norman gave the following response:

> Students have to do more thinking before they just answer. Common Core is not just a rote response. I tell students that just knowing that an area of a triangle is 1/2 base times height is not enough. If I know that the area of a rectangle is base times height and cut that rectangle in half, I have two triangles and divide it by two. That is the difference. That's Common Core verses the old way. The area of a rectangle is base times height and the area a triangle is 1/2 base times height that's not just spitting out formulas. That's what I want the kids to be able to come back and say to me.

Norman continued to reflect positively on the impact of CCSSM on his student's thinking and the changes in his instructional practices.

> Implementing Common Core means continually asking the word 'why'. If you ask the students to solve an equation and they find that x = 9, then you ask why. How did you get that? For me I find different things that explain it to them to let them see it and understand it.

The task Norman selected to characterize his implementation of CCSSM also encouraged students to use manipulatives to represent, evaluate and explore real-world situations using algebraic expressions (see Appendix G). Norman's task allowed students to use Skittles as a manipulative, while they were building algebraic expressions. The

goals of this task were for students to further develop their understanding of reading, writing and evaluating expressions. For example, students were asked to respond to the following two questions:

1. What is the difference between an expression and an equation?
2. Why is it important to be able to write verbal expressions as algebraic expressions and sentences as equations and vice versa?

Toni's orientation towards the curriculum was reflected in her response to what she valued most about CCSSM:

> I value the part where Common Core requires students to explain the work. For the longest [time] we could just say here is this equation, but when you get to high school it's more than show me how to do this equation. It's telling me why you did this equation or telling me how you did this equation. It makes the kids talk more through the math as opposed just knowing how to do something. You have to be able to talk about it as well.

Moreover, Toni also noted changes in her instructional strategies to get students to understanding the meaning behind the mathematics.

> I had to push myself. So once I started pushing myself, then I begin to love getting my kids to think. Then I started getting my students to understanding the why behind certain things. It is challenging to get them to understand the meaning behind why we are doing what we are doing.

Like several other participants, Toni's task selection also allowed students to make real-world connections using systems of linear equations (see Appendix H). The goal of this task was for students to create a comparison model using similar situations to

determine the best value. For example, students were asked to examine and compare rates using either cellphones plans or monthly fees and price per gig of data, or compare the base price for two cars and the cost of driving the car.

Responses to interview questions about the teachers' instructional planning and pedagogical strategies utilized in the classroom with students indicated teachers believed the curriculum was beneficial for students. In addition, participants' selection of artifacts also revealed knowledge about their orientation towards curriculum reform. All participants selected tasks going beyond procedures to largely develop students' cognitive skills. For example, Toni selected a task, which extended students' thinking from the procedure of solving systems of linear of equations to creating and solving systems by making real-world connections. Although these participants selected different tasks to demonstrate implementation of CCSSM, their selections each showed the teachers' desire to build a deeper more conceptual understanding of the mathematics in their students. Clark et al., (2014) contend that teachers and students find value engaging in challenging tasks, particularly "under-achieving students" (p. 4). Their research agreed with the teachers' views of engaging students in challenging tasks to support worthwhile leaning in mathematics classrooms.

Students' Success

The teachers in this study perceived their students as capable of performing high levels of competencies. Another way participants in this study navigated CCSSM was through their ability to focus on students' success. This subtheme developed from examining participants' responses to multiple interview questions. In particular, the

participants' focus on their students' success emerged as a pattern in response to their greatest satisfactions while teaching and what they valued most about CCSSM. As a result, three participants' responses focused on students' growth and their ability to impact the students' future. Karen, Toni and Gary's responses complemented each other all emphasizing their satisfaction in seeing students' growth.

Gary noted, "I like seeing students have those aha moments. I like seeing where they started from and knowing that the light is finally coming on for them." Gary's response may indicate that he was influenced by his desire to see his students succeed. This is indicated in his response to what he valued most about CCSSM.

> What encourages me is making sure that I am delivering the best instruction possible to the kids. My goal is not to fail them. To not fail them, I stick to the standards. Not just to teach the standards, but to make sure they will be well equipped for the next grade. That way, progression and growth go from grade level to grade level.

Gary's desire to help students make connections across mathematical content is supported by McCaffrey et al.'s (2001) analysis that one significant shift of standards-based curriculum reform is emphasizing connections among ideas and applications rather than isolated concepts and procedures (p. 494).

Karen expressed joy at seeing her students' growth. When asked to describe what encouraged her implementation with fidelity she expressed the following concerns:

> To see the kids succeed. When they look at some of the standards that are aligned to Common Core a lot of them already feel defeated, but once I work with them

> and they work with me to see that they got it. To see that their numbers [Formative assessment scores] are above other numbers to see their successes; that makes me want to really do it.

Although Karen was motivated by her students' success, she also indicated that navigating the curriculum implementation process required her students to persevere through challenging concepts. Frey et al., (2014) agrees with the notion that teachers' abilities to help students develop vital "mathematical habits of mind" are key to effective mathematics instruction (p. 489).

Toni also shared notions of her students' success as reassurances of her implementation of CCSSM with fidelity. She stated:

> What encourages me is that I want my students to be successful. I want them to get whatever it is they need to be able to move on to the next level. What discourages me is that Common Core is more complex than what they are used to. So it's discouraging when I say explain to me your reasoning, show me how you got this answer. It's discouraging when they have difficulty doing that. But, I am still encouraged to teach them, because I know that's what they need to be successful later on.

Toni's view confirmed prior research indicating that rigor in Common Core standards requires teachers to shift from merely helping students develop skills needed, to supporting their ability to think critically and solve complex problems (Polly & Orrill, 2014; Rothman, 2012).

Looking beyond their students' current growth, Belinda and Norman both found satisfaction in the way their instructional strategies influenced their students' future. Belinda expressed that knowing that the instruction she gave daily influenced her students' future aspirations was her greatest attainment. When asked to describe her greatest satisfactions while teaching Belinda shared the following response:

> Seeing my students excel. Seeing students become engineers and doctors, there are so many paths. Over the years, when I see my students go through and become what they want to in life, it is such a gratifying experience to know that I was a part of their life.

Similarly, Norman found fulfillment in reaching students whom he thought "weren't initially interested in learning" and seeing them share experiences later. He reflected on his greatest satisfactions teaching.

> My greatest satisfaction is being able to reach some of the students…I have had several students come back and shared that I had a positive effect on their lives. That's the greatest parts of teaching, realizing that you really did make a difference. So, I take that as the most rewarding part.

Gary and Norman were also equally as concerned about the students whom they felt were not as successful in their achievement with CCSSM. When asked about his greatest disappointment, Gary said "I came into teaching thinking I would be able to transform and make a difference for all students, but then I realized that some students lacked the proficiencies and some basic skills needed to master the expectations of Common Core." Although disappointed, he stated, "I try to build them up and bring

them as far along as I can." Norman also felt disappointed by students he could not reach. He noted "I think the greatest disappointment, especially now, is the lowering of expectations that students' have for themselves." These responses detailed participants' views indicating their students' success was a significant influence on them navigating CCSSM.

Teacher/Student Relationships and Effective Learning

This theme examined participants' use of equitable teaching practices to support their students' success; and highlights the importance of building positive relationships. In addition to the views and orientations navigating CCSSM, it was also important to investigate the equitable teaching principles utilized by the five teachers in this study. This theme built on the previous theme connecting the teachers' views while capturing the commonalities among participants' equitable teaching principles. Equitable teaching examines a teacher's ability to make appropriate accommodations, which promote access and attainment while understanding and attending to students' cultural needs (NCTM, 2000). According to Hand (2012), equitable mathematics teaching engaged a wide-range of learners in rigorous mathematics by: attaining success with non-dominant learners; encouraging conceptual understanding, ownership and belonging; and limiting occurrences of opposition into mathematics instruction (p. 237).

Thus this theme also addressed RQ1: What are the common practices used by teachers who find success implementing CCSSM with African American and Hispanic American students? Interview data showed the five teachers employed equitable teaching strategies. Confirming Manouchehri and Goodman's (2000) notion teachers'

knowledge of mathematics, ability, and practices are essential to effective implementation of curriculum materials. Participants teaching practice demonstrated their ability to make meaning connections with students to support rich classroom instruction. Within this theme two subthemes emerged are connecting with students and rigor in classroom.

Connecting with Students

This sub-theme examined the various ways participants sought to develop relationships and build rapport with their students and how this influenced student success. This concept of connecting with students aligns with Ladson-Billings (1997) findings suggesting teachers must extend beyond their knowledge of how to best teach diverse learners, to building relationships which connect students to classroom communities. In a similar manner, Battey's (2013) findings maintained teachers use positive relationships to support reform practices that challenged students to delve deeper into the mathematics. Hand (2012) also contended teachers building classroom cultures centered on principles of equitable teaching, encourage teachers to move students to take ownership and develop a sense of belonging. The current study confirmed these findings and also indicated various ways teachers utilized effective instructional strategies to counter the demographic challenge of teaching ethnically diverse students.

All participants seemed to look for ways to connect and engage a wide range of students in their instruction. Reponses throughout the interviews indicated participants achieved this goal in a variety of ways. When asked about the secrets to his success implementing CCSSM, Gary noted:

> Building relationships with my students. It's all about my students seeing that I believe in them. I try to let my students know I am interested in them both inside and outside of the classroom. I also try to build a culture in the classroom where that space becomes ours, mine and my students'.

However, Karen and Norman sought out ways to build relationships primarily through their classroom instructional practices. Karen, used her classroom management system to reward students and build positive relationships with her students. Students received stickers for mastering standards throughout their instructional units. Karen explained "students with the most stickers get invited to a pizza party" and "I also make positive phone calls home." She further explained her system is about teaching students to feel good about themselves while fostering positive relationships.

> I try to do these extrinsic rewards, but I also get to teach them to feel intrinsically good about themselves. Trying to teach them some real-life that it's about how you feel. Do you feel like you did better than someone else? So that's good. You see that little feeling you get on the inside, that warm fuzzy feeling…. It's not all about some tangible treat, but you should feel good just knowing that you did your best.

Norman spent time finding activities connected to students' interest. When asked to describe his secrets to success, Norman responded:

> Relationship building, and working hard to make myself happy with what I am doing. If I am enjoying what I am doing, then students enjoy it a little more. I look for things that I like to do so that I know they like to do as well. If we are

> doing something with electronics or technology, then I don't mind searching the web and finding something…if I like it then they seem to feed off that. I don't mind finding games and different activities related to the standards and letting the class explore. I find that if I like it and I am happy with it, then they tend to feed off that.

Belinda also recognized the challenge of connecting with students who struggle to understand the mathematics she tries to convey through her classroom instruction. She expressed that an important part of her work is to help her students love math. She stated, "The challenge is being able to deliver it to students' who don't like it and especially to children who not only don't like math, but find it hard." Her ability to build positive relationships with students also has replicated rewards for her as a teacher. She further revealed this about her students, "When I am done, they say you helped me to like math a little more."

Toni used afterschool tutorial sessions to support and build relationships with her students. She recognized "Some students are successful and some are not, but they don't give up. That's what makes me come back the next day." She encouraged her students not to give up. In return, she shared that her students might say: "Mrs. 'T' are you going to show me again?" She further stated "my students want to learn". Even though these participants used different methods to build positive relationships with students, they all found that their work contributed towards their students' success. Participants in this study confirmed, Hand's (2012) claim that teachers who supported students' belonging in the classroom encouraged their ability to develop mathematical reasoning.

Rigor in the Classroom

This theme focused on the overlap of teachers' utilization of equitable teaching principles and their ability to build positive relationships with students. The principles of equitable teaching challenges teachers to build positive relationships, which encourage students to be engaged in rigorous learning. Data analysis from interviews and documents also revealed teachers utilize strategies that engaged a wide-range of learners in rigorous math, attained success with students who were traditionally less engaged, and encouraged students to develop conceptual understanding (Hand, 2012). Irrespective of the school or experience level, participants in this study all spoke of the challenges they faced, due to the rigor of the standards, teaching ethnically diverse students.

When asked to describe a typical student in their classroom, most participants described students largely by low proficiency levels, low self-esteem gaps and often distracted academically. On the other hand, they all seemed to view their students as capable, worthy, and eager to succeed provided they had the right motivations. Participants shared similar stories about the challenges their students faced academically. Belinda had this to say: "a typical student is one who is afraid to ask questions and let me know that they don't understand." She continued describing how she goes through several days of lessons and later discovers "Jane says 'I didn't get it when you taught it last week'." Like Belinda, Karen described her students' challenges through this anecdote: "you want us to write the problem?' Yes, I do. 'We have to show our work too?' Yes, you do. 'Awe that's doing too much."

Norman, Toni and Gary also used similar characteristics to describe a typical student's attitude towards academically engaging in CCSSM. Norman noted, "A more academically challenged math student who wants to do better. Someone that wants to learn, but lacking the basic skills in math… My typical student has a little lower self-esteem when it comes to education." Toni shared, "A typical student in my class would be below level. They come to class every day and they try. You do have a few who don't try, but the majority of my students ... come and sit down and ... try." Gary described his typical student as "It's also a student that can sometimes, but lacks the effort and sometime shut down."

Despite the challenges their students faced meeting the expectations of CCSSM, participants in this study gave attention to equitable teaching principles. All the teachers found ways to create classroom-learning environments that would emphasize active engagement in rigorous mathematics. Belinda looked for opportunities to consistently make lessons interesting for her students. She explained:

> If your lesson is fun and ... they are interested in, that's what you have to do to consistently engage students. If they have no connection to the lesson, then it's not going to reach them. If your lesson is fun and they can connect to it, then you will have them engaged.

Gary described his typical student and shared ways in which he met the challenges he faced while teaching.

> The typical student in my class desires to learn, but sometimes they are not sure about their math capabilities. I feel like it's my job to build that student up to

where they have the fortitude, mental capacity as well as the confidence in order to engage in the mathematics. Once they found success, it only takes one time for the most part. The typical students in my class want to succeed. They want to get a good grade. They want to have the satisfaction of knowing that they can do something.

Karen struggled to get students to complete rigorous tasks. The anecdote below neatly captured her instructional approach:

> Getting kids to complete rigorous activities when they lack the basic skills and the foundations is challenging. I engage them in CCSSM by reminding them of the SMP and I let them know what we are going to do. I communicate the intentions and let them know this is what I need you to do and this how we are going to do it.

Norman felt teaching CCSSM is more challenging when working with students who are ethnically diverse due to their demographic challenges. He described some of the challenges his students' face and the equitable practices he uses to help his students engage in CCSSM.

> The students I teach are extremely happy to get a 70 or to barely make it. We are working much harder than other teachers in the same building because of the challenges we face with Common Core implementation. Many more students are academically challenged and have shorter attention spans. With Common Core, students have to think more. Therefore, to help students think more and to

implement Common Core, I have to use a lot of different strategies including on-line resources and technology.

Toni blamed previous teachers for failure to provide students with enough foundational knowledge for the next teacher to build on. She reflected on the learning difficulties confronting her students and how she supports their mastery of the standards.

> I think it's [CCSSM) more difficult for the students I teach in particular. Just basically because they are still trying to master basic skills and previous standards. On top of that, I am giving them more on-level standards. So I think that it's more difficult for them for that reason. I feel like if they had a better foundation, they would cruise right through. I try to make it relevant for them and help them see the real-world connections by using tasks.

The teachers shared common challenges implementing CCSSM with students in their school. However, equally common among these participants was their determination to find ways to counter their students' challenges with practices that engaged a broad range of learners in rigorous mathematics. Interview data seemed to reveal all participants' utilized principles of equitable teaching to counter the influence of students' demographics on the implementation of the curriculum. These findings supported Lubienski and Gutierrez's (2008) claim that teachers who make cultural connections to mathematics instruction helped support the development of more equitable classroom outcomes for all students.

Organizational Structures drive CCSSM

This theme suggested that a school's organizational structures supports or discourages teachers' implementation of CCSSM. The theme captured participants' interpretations of the classroom/school pressures influencing their implementation of the curriculum. This theme connected to the previous themes relating to the challenges teachers faced instructing minority students, however it focuses on views centered on the influences of high-stakes accountability. It also addressed RQ2 guiding this study: What aspects of the classroom/school environment influence the common practices of teachers who find success implementing CCSSM with African American and Hispanic American students?

Responses across cases revealed participants felt pressures of high stakes testing influencing their implementation of CCSSM. Teachers, felt pressure to implement curriculum in a timely manner. They felt pressure to make sure their students were prepared for the next level. Some felt pressure knowing that their evaluations could be affected by their students' achievement measured on statewide assessments.

The participants' views concerning these pressures were shared in their response to the aspects of the classroom/school environment that influenced their implementation of CCSSM with students. Belinda, Karen and Norman identified the influences of high-stakes testing in a direct way and gave concrete examples of its influence on their implementation of CCSSM. Gary and Toni gave indirect responses. Literature on the classroom/school environments influenced by high-stakes accountability confirms participants' responses indicating increased pressures causing teachers to focus more on

preparing students for high-stakes testing above curriculum expectations (Abrams, Pedulla, & Madaus, 2003; Harrison-Jones, 2007; Valli & Buese, 2007).

When asked to identify aspects of the classroom/school environment influencing implementation of CCSSM, Belinda expressed direct concerns about the pressures of high-stakes testing. She succinctly expressed frustration with school administrators as she struggled to meet expectations.

> Because I have participated in various trainings with Common Core implementation, I know what is expected in the classroom. I have had a variety of training on Common Core. What discourages me is that sometimes I am not able to implement the standards the way they [administration] expect. If my administrators don't agree that what I am doing is right, I have one thing in my mind of what I should be doing and they may say that I am not doing it right. That becomes a challenge for me. It becomes a discouragement at times.

Karen expressed similar frustrations towards her school's 'my way or the highway' policies regarding implementation of CCSSM. The following anecdote neatly captured her struggle to teach with administrative constraints:

> I feel empowered when I am actually able to teach, without worrying about constraints. When I am allowed to give a lesson the way I want to. What encourages my implementation is my evaluations, I think what they expect with Common Core is a little more challenging and difficult for the kids.

Norman also expressed direct concerns about the pressures of high-stakes testing. Norman felt testing forces him to focus on test scores at the expense of real teaching and

learning. He simply shared one word "results". Reflecting further on this notion, he stated, "I have results that I am trying to get. I know I can't reach everybody, but I know I can reach a lot." As Norman continued to reflect he pondered this question, "How long will it take the testing to catch up with the curriculum?" He further concluded, "As a country and a state, we are looking at testing as an instrument to measure whether the teachers and students are doing well." Norman's concern for the accountability of high-stakes testing and the expectation of CCSSM resonated in his response.

On the other hand, Gary and Toni discussed the influences of high-stakes testing in an indirect way. Their concerns about the pressures teachers faced were revealed unintentionally in their expressions relating to their students' success. Gary felt he should be given more autonomy over what he teaches and how he teaches. He complained about the need for states to control the implementation of CCSSM in an effort to standardize how students are taught and tested. He lamented:

> I know the goal is to put everyone on the same playing field across all states. I know some states had problems with their proficiencies in regards to mathematics educational goals. I understand that and I think that although these standards are great, we should have some leeway to make adaptions for the students we serve.

Toni echoed similar frustrations with the tightly centralized control over the implementation of CCSSM. She shared the following concern:

> Sometimes because of time, we don't have the time to spend on different standards and be able to go into teaching them the way they are written to be taught. I feel like the standards are nice and they are very rich. However, I don't

think the time we are given to actually teach the standards is sufficient for the amount of content that is expected.

Overall, participants' felt like they had no control over their flexibility in implementing the curriculum and their responses indicated school/environmental concerns related to their implementation of CCSSM. It is important to note that some participants indicated direct concerns, while other concerns surfaced indirectly in response to the interview questions. Participants' views supported Opdenakker and Damme's (2007) findings showing significant relationships existed between school composition, school context, and school practices on teaching and learning.

Summary

In this chapter, I utilized the basic interpretive research method using a comparative analysis approach to capture the nature of the common practices impacting the implementation of CCSSM for the five successful teacher models in this study. Chapter 4 provided the findings through my analysis and reflections of interviews, documents and transcriptions. By employing a step-by-step procedure of analyzing data from all sources, three primary themes emerged from this study. The three themes relating to participants' common practices are (1) views navigating CCSSM; (2) teacher/student relationships and effective learning; and (3) organizational structures drive CCSSM.

Participants' responses indicated implementation of the CCSSM curriculum was a priority and a high emphasis was placed on their students' success. First, teachers expressed positive orientations towards CCSSM and its impact on their students'

thinking. Secondly, they emphasized the importance of employing principles of equitable teaching to mitigate the challenges associated with teaching African American and Hispanic students. Data analysis also indicated the significance teachers found in building positive relationships with students and engaging them in rigorous mathematics, supported their effective implementation of CCSSM. Finally, this study revealed the five teachers' frustrations with the school's structural problems of close monitoring of CCSSM implementation. Seemingly, these pressures created environments influenced by high-stakes testing.

The findings of this research study identified common practices used by the five participants successfully while implementing curriculum reform. The data suggest there are implications and suggestions for research, policy, and practice. In the next chapter, I conclude the dissertation, discuss the limitations and implications of the study and offer suggestions for further research.

Chapter V

DISCUSSIONS AND IMPLICATIONS

In this final chapter, I conclude my study on the common practices utilized by teachers who find success implementing CCSSM with African American and Hispanic American students. This chapter presents a brief summary of the purpose of the study, the research questions, the methodological approach and the conceptual framework supporting this study. I interpret the findings, discuss the limitations of the study and the implication for research, policy and practice and make recommendations for those invested in the mathematics education of ethnically diverse students. I conclude by offering suggestions for future research.

The current study examined the common practices of successful teachers implementing CCSSM in schools with African American and Hispanic American student populations, while employing qualitative research methods. Utilizing interviews and documents as my primary sources of data collection, I sought to inductively make meaning of the practices used by these teachers to answer my two research questions:

RQ1: What are the common practices used by teachers who find success implementing CCSSM with African American and Hispanic American students?

RQ2: What aspects of the classroom/school environment influence the common practices of teachers who find success implementing CCSSM with American and Hispanic American students?

As indicated, in this study I employed the basic interpretive methodological approach (Merriam, 2009). Purposeful sampling was utilized to interview five participants who were identified as successful teacher models implementing CCSSM with African American and Hispanic American students in their schools. After identifying participants, interviews were conducted using Seidman's (2006) three-structure interview process, and examined artifacts representing samples of participants' implementation of CCSSM. This study was conducted over a 6-month period, where I met participants at their perspective schools to conduct interviews seeking to make meaning of their implementation of CCSSM. After completing the interviews, transcripts were sent to participants to clarify the content and meaning. Additionally, throughout the process of conducting this research, I reflected upon and acknowledged my own biases to address my subjectivity.

Borrowing from Merriam (2009), the data analysis used a step-by-step process of category construction, sorting categories and data, naming categories and developing themes. The first step began during transcription of the interviews and documents. I utilized open coding (Merriam, 2009) by taking raw data from each transcription of each set of interviews and documents and made notations next to small pieces of data that seemed useful in answering the research questions. Categories were inductively developed by comparing the transcriptions of the first interviews to the transcriptions of the second set of interviews. This process was repeated several times throughout the research as each piece of data was reviewed.

Second, I inductively and deductively constructed categories that captured reoccurring pattern or patterns across data sets. Comparative data analysis process was

used to check the categories from one interview with another interview keeping some categories while eliminating others (Merriam, 2009). The same process was repeated with document analysis. Third, names of categories were synthesized to develop more theoretical themes utilizing my observation of participants, my personal reflection of the data and the literature underpinning this study.

Employing the basic interpretive research methodology, I developed three themes from the data to answer this study's research questions. I reported the findings in the previous chapter (Chapter 4) using the participants' quotes to capture their experiences. My personal interest, curriculum reform, equity, and the classroom/school environment influences on students' mathematics achievement were the four paradigms that supported the conceptual framework for this study.

Evidence in this research endorsed the conceptual framework used to support this study, which included an understanding of curriculum reform, principles of equity and classroom/school environmental influences. Analysis of the data suggested regardless of the challenges teachers of ethnically diverse students faced during curriculum reform, the quality of the classroom instruction impacted the achievement of their students (Gardner & Miranda, 2001). Although the five teachers interviewed in this study maintained a professional reputation of having successful practices in their school with African American and Hispanic American students while implementing CCSSM, there was evidence that some shared expressions of the stereotypes associated with minority children and learning. For example, at times during the interview some responses

indicated low expectation of the students and illuminated the idea of spreading the blame for low student achievement.

At the time of this study, 60% of the participants' classroom instructional time focused on teaching students who were considered on-level by their school and district codes. Participants' recent state assessment data showed comparable assessment scores to their district and state for African American and Hispanic American students. Moreover, these teachers had a self-identified commitment to their students' success. For example, Norman shared his greatest satisfaction as being able to reach some of the students whom he didn't think was initially interested in learning. He stated, "The greatest parts of teaching is realizing that you really did make a difference."

The key findings in this study indicated that all participants shared concerns about the expectations of CCSSM and the impact it had on the achievement of their students. Participants indicated similarities among their views navigating CCSSM and the effective practices they utilized implementing CCSSM with minority students. Three major themes specifically responding to the research questions in this study were developed from the data. These are: (1) views navigating CCSSM, (2) teacher/student relationships and effective learning and (3) organizational structures drive CCSSM.

Discussion of Themes

This study's themes show the similarities and differences across participants in their understandings, practices, and influences as they implemented CCSSM with African American and Hispanic American students. However, there were more similarities than differences among participants. Although, participants shared similarities in their school

populations and student demographics, I found no significant similarities across participants in respect to their age or experience. It is also significant to note the teachers in this study all held at least a master's degree, indicating the importance they placed on extending their educational background. The five African American teachers in this study seemed to understand the notions expressed in Battey's (2013) research suggesting that teachers understand the significance of racial aspects of the classroom as well as the mathematics knowledge and instructional practices needed to teach African American and Hispanic American students. It is important to acknowledge the teachers did not express any particular distinctions they made between African American and Hispanic American students in their views or instructional practices.

Participants had similar views navigating CCSSM. Mainly, their views navigating CCSSM indicated similarities in their orientations towards CCSSM. They had similarities in their focus on students' academic success as an influence of their implementation of the curriculum. Secondly, participants shared views focusing on the significance of teacher/student relationships in employing effective teaching practices. Lastly, participants expressed concerns that the organizational structures of the school mainly drove their implementation of CCSSM.

The first theme, views navigating CCSSM, specifically examined the understandings participants shared concerning their dispositions and motivations towards the curriculum implementation. The second theme focused on teacher/student relationships developed while employing principles of equitable teaching and examined similarities in the practices utilized among the five participants while implementing

CCSSM. This theme examined the methods teachers used to build relationships and engage students in rigorous mathematics instruction. The third theme, organizational structures drive CCSSM, examined the aspects of the classroom/school environmental pressures influencing participants' implementation of CCSSM. This theme focused on the teachers' views that the organizational structures and classroom issues leave little room for creativity in their instructional practices.

Theme 1: Views Navigating CCSSM

The first theme examined the views and dispositions which resonated across the five participants, indicating that teachers maintained positive orientations towards the curriculum and focused on their students' success while navigating curriculum implementation despite the expectation of CCSSM or the challenges students' demographics offered. Utilizing the comparative analysis process to examine the commonalities among successful models led to rich data indicating participants' views were positive towards CCSSM and their focus on students' achievement was instrumental to successful implementation. Overall, teachers' views supported the implementation of CCSSM and found changes in not only their practice, but in the ways it impacted their students' learning and interactions with the curriculum.

Positive Orientations

Positive orientations examined participants' dispositions towards CCSSM and how this influenced their students' thinking. Teachers believed CCSSM challenged students to go beyond the basic skills to develop a deeper more conceptual understanding of the standards. This concept of a teachers' orientation towards curriculum is defined as

their views and dispositions towards mathematics teaching, learning, and curriculum, as it influences their engagement and interactions with curriculum (Remillard & Bryans, 2004). Participants' positive orientations towards the curriculum were expressed in numerous ways. Collectively participants expressed positive views towards CCSSM as a means for influencing their teaching practice and students' thinking.

Participants all recognized the influence CCSSM had on supporting the development of mathematical thinking in their students and changes in their instruction. For example, Belinda made adaptions in her practice of implementing mainly direct instruction, to incorporate a variety of strategies to support her students' learning. Belinda describes the changes as different means of learning in her classroom. She indicated, "I am learning from students, they are learning on their own, they are learning in small groups and with technology." One approach of understanding what occurs during classroom implementation, according to Remillard (2005), is how teachers make use of and are influenced by the curriculum. All participants made observations indicating changes in their classroom instructional practices.

Karen observed changes in her own practice, as well as challenges for her students due to the rigor of CCSSM. Karen found it necessary to make adaptions in her instruction to connect foundational skills with the current grade-level standards to support her students' learning. She shared this anecdote, "Common Core has forced me to connect basic skills, pre-requisite skills, and current skills together so that students can not only just know the skills, but how to apply them." According to Drake and Sherin's (2006) this change in practice is indicated by the notion that teachers make different

decisions about adaptions due to their understanding of the curriculum, and their perceptions of students' abilities.

In line with Drake and Sherin's view, Gary found CCSSM pushed him out of his comfort zone as a teacher. He stated, "I would say it has stretched me in ways that I didn't know, I could be stretched. It has made me alter some of my teaching practices." Although Gary understood the challenges of curriculum implementation, he continued to focus on the importance of his students' thinking. Making adaptions for Gary demanded finding ways to improve his classroom instructional practices to influence his students' thinking. This was noted in his reflections, "How am I going to teach this? How am I going to convey this to the kids?" Similar to Gary's reflection, Toni also found she had to change her practice in order to get her students to understand the rationale behind the math. She shared the following observation:

> I had to push myself. So once I started pushing myself, then I begin to love getting my kids to think. Then I started getting my students to understanding the why behind certain things. It is challenging to get them to understand the meaning behind why we are doing what we are doing.

Norman also cited changes in his instructional practices to support students' ability to reason. Norman discussed that implementing Common Core nudged him to continuing to reflect on different ways to help his students understand and explain their thinking.

> Implementing Common Core meant continually asking the word why. If you ask the students to solve an equation and they find that x=9, then you ask why. How

did you get that? For me I find different things that explain it to them to let them see it and understand it.

These adaptions cited by all participants allowed a deeper understanding of their experiences as learners and teachers of mathematics, giving greater insight to their implementation of the curriculum (Drake & Sherin, 2006). In addition to participants 'positive orientations' towards the curriculum as reflected in their views noted in the changes in their practice and the development of thinking in their students; teachers' selection of artifacts also indicated positive dispositions towards the implementation of CCSSM. I asked participants to select artifacts, which represented their implementation of CCSSM. The idea of positive orientations towards curriculum implementation was reflected in all five participants' selection of artifacts. Participants selected tasks that would increase students' overall engagement in mathematics beyond just applying algorithms or developing skills.

One explanation of the teachers' ability to make the shifts expected by CCSSM was eluded in Belinda's statement "Because I have participated in various trainings with Common Core implementation, I know what is expected in the classroom." The various trainings provided for teachers in this school districts seemed to support their understanding of the importance of mathematical tasks into their classroom instruction. Mathematical tasks call for students to engage with concepts to make purposeful connections of relevant mathematical ideas, while promoting their thinking (Stein et al., 2009).

The teachers seemed to understand the importance of selecting worthwhile tasks to promote their students' ability to think. Overall there were no gender differences in the teachers' selection of tasks, but the two eighth grade teachers Belinda and Toni selected tasks, which allowed students to create and develop mathematical thinking at higher levels. While the other three teachers, Gary, Karen and Norman's tasks allowed students to build an understanding of their mathematical concepts using concrete manipulatives.

Toni selected a task, which allowed her students to demonstrate their ability to make real-world connections across mathematical concepts like using systems of linear equations. Exposing students to worthwhile mathematical tasks was strongly recommended by the research framing this study (Clark et al., 2014; NCTM, 2000; Stein et al., 2009; Stein & Kaufman, 2010; Van de Walle, 2007). As a result, the teachers' selection of artifacts seemed to confirm their orientations towards a rich curriculum focused more on problem-solving and task, rather than on skills and algorithms.

Belinda's task illustrated this with a goal of permitting students to connect the real-world idea of making and selling bracelets to creating and representing equations and functions in a variety of mathematical representations. Gary, Karen and Norman selected tasks, which required students to build conceptual understanding while using manipulatives. For example, Karen selected a task that required students to measure the distance around real-world circular objects to examine the relationship between the circumference and the diameter of the circle. According to the research in this study, mathematical tasks not only focused students' attention on mathematical concepts, but

help them to develop mathematical thinking and become self-regulated learners (Clark et al., 2014; Stein & Kaufman, 2010).

Largely, the teachers' views and dispositions were positive towards the curriculum, including the influence the curriculum had on changes in their teaching practice and students' thinking. However, some teachers made distinct mentions of the time constraints due to curriculum implementation. Teachers' selection of artifacts also supported a positive orientation towards CCSSM. The consistent findings in the literature framing this study indicated that when teachers' views are more in line with the goals of the curriculum reform, classroom instruction is more favorable to student learning (Charalambos & Philippou, 2010; Drake & Sherin, 2006; Remillard & Bryans, 2004). The current study suggests that the opportunities for learning provided to the students influenced students' success as discussed in the following subtheme.

Student Success

Participants' attention and concern for their students' success directed their classroom instructional practices while implementing CCSSM. Overall this theme connected the teachers' high expectations to their student achievement. The concept of teachers' views and student success is cited in Ladson-Billings (1997) study, which found that when teachers expected students to perform at high competencies, they were more likely to be successful. The teachers in this study agreed with this notion, as they all understood the rigor of the curriculum and the challenges it presented to their students. Participants' responses indicated not only a desire to influence their students' achievement, but a need to make a difference in their future lives.

Gary indicated the expectations and the basic skills needed to master CCSSM helped him navigate curriculum implementation by conceptualizing the need to focus on building the proficiencies of his students. He stated, "My goal is not just to teach the standards, but to make sure that the progression and growth go from grade level to grade level." His view aligned with Remillard and Bryans' (2004) findings indicating teacher's views were closely connected to the way they conceptualized the curriculum in their teaching; it was reflected in their sincerity to implement the curriculum with fidelity. Although Karen also understood the challenges her students faced progressing through CCSSM, she still focused on her students' success. She shared, "to see their [the students] successes… makes me want to really do it [implement CCSSM]." Norman believed although he may not reach all of his students he felt, "I will always have a goal that I am trying to reach to get the point across and making sure that they understand it. So, I have to keep going at it."

Belinda's reflection on her students' success illustrated how focusing on curriculum implementation supported her students' future aspirations. She stated, "Seeing my students …become what they want to in life is such a gratifying experience to know that I was a part of their life." Although Toni also focused her instructional practices on students' success, she revealed feelings of discouragement and challenges due to the expectations of CCSSM. Yet, she still believed in her students' ability to be successful with the curriculum, aligning her beliefs with the other four participants. She shared "it's discouraging when they have difficulty…but I am still encouraged to teach them, because I know that's what they need to be successful later on."

In this study, the participant's views regarding their students' challenges and successes during curriculum implementation aligned with Remillard and Bryans' (2008) research, suggesting that teachers utilizing what they knew about student thinking allowed them to better navigate curriculum implementation. Remillard and Bryans' research found that as teachers learned more about student thinking, they were able to enhance their instructional practices. For example, as Gary understood more about Common Core, he adjusted the way he taught his students. He stated, "It has made me alter some of my teaching practices…Common Core wants you to be able to model these things. Students are expected to explain the reasoning behind these concepts." Gary's description chronicles the other participants in this study, suggesting that as they understood more about their students and the curriculum they were implementing, their instructional practices improved.

Theme 2: Teacher/Student Relationships and Effective Learning

The second theme identified significance participants placed on their teacher/student relationships and use of equitable teaching practices to support their students' success. The teachers in this study utilized the knowledge of their students' cultural to cultivate positive relationships with their students. This theme built on participants' views navigating CCSSM, but focused on aligning the practices they utilized with the principles of equity. In the current study, this theme is defined by teachers' ability to employ equitable mathematics teaching to engage a wide-range of learners in rigorous mathematics by attaining success with non-dominant learners, encourage competency, ownership, and belonging in the classroom. Commonly cited

amongst the teachers in this study were evidence of practicing equitable teaching by finding ways to connect with students and to engage their students in rigorous mathematics instruction.

First, all five teachers in this study demonstrated ability to make positive connections to their students. The teacher/student relationships were utilized to make connections to the students. Participants in this study developed their ability to understand the cultural relevance of the students they were teaching by making connections inside and outside of the classroom. This was illustrated in their examples of attending sports events, having pizza parties, and providing time for after school tutorials. These means of connections were then transferred to the classroom to promote effective learning and teaching.

Connecting with Students

The five participants in this study saw the benefits of connecting with their students as a means for engaging students in rigorous mathematics experiences. Borrowing from Ladson-Billings (1997), connecting with students encouraged teachers to build classroom communities which not only extended beyond the best ways to teach diverse learners, but allowed teachers to build and maintain strong positive relationships with students. Building relationships was a key concept in this study because participants used it to support their curriculum implementation. Participants in this study found ways to build positive relationships with their students using a variety of techniques. Data indicated utilization of opportunities outside of the classroom, such as attending a

students' basketball game; as well as opportunities in the classroom, like their instructional practices to build positive relationships with their students.

Methods used by the five participants to build relationships with their students was their way of creating and communicating a culture of what was important in their classroom. Participants shared common beliefs aligning with Lewis' (2007) observations of the importance of building classroom cultures that support the mathematics achievement of minority students. Two teachers, Gary and Karen, made efforts to connect with students inside and outside of the classroom. Gary developed relationships with his students beyond the classroom by spending time attending students' extracurricular events. However, he also recognized the possibilities he was making in building his classroom culture. He assessed his classroom as a collective environment. He stated, "I also try to build a culture in the classroom where that space becomes ours, mine and my students."

Karen focused on the academic achievement and made connections to her students in her classroom and provided what she referred to as "extrinsic rewards" outside of the school day. She explained, "… students …get invited to a pizza party." Karen was the only participant to acknowledge connecting with parents was also a form of building a positive classroom culture for her students. She stated, "I also make positive phone calls home." Karen understood the importance of parent and school collaboration in educating children. Karen's practices aligned with Hand's (2012) assertion indicating when teachers actively seek understanding of students' experiences,

they effectively shifted the classroom instruction to support students' mathematical achievement.

On the other hand, Belinda, Norman and Toni primarily utilized instructional practices inside the classroom to build positive relationships with their students. Battey (2013) maintained teachers use positive relationships to support reform practices that challenged students to delve deeper into the mathematics. Belinda exemplified this practice through the use of her classroom instruction to connect with students who struggled to understand the mathematics she often tried to convey. For Belinda, building positive relationships with students seemed to focus on helping students develop an appreciation for mathematics. She indicated, "The challenge is being able to deliver it to students' who don't like it and especially to children who not only don't like it, but find it hard." At times teachers may often confuse lack of motivation with student's inabilities to perform tasks. Although Belinda recognized the challenges of instructing diverse students, she found it difficult to find the balance between employing equitable teaching principles and academic excellence.

Norman utilized learning experiences that supported his students' various learning styles while trying to make the learning relevant to his students. Norman spent time finding games and tasks to help connect to students' interest. Toni also used her classroom instructional practices to build a classroom culture of connecting to her students through utilizing a model of the teacher and students supporting each other. She shared, "I break off in small groups so I can facilitate…I feel like I can really help the students who need my help and the ones who don't get to work independently or with

peers." Toni's classroom practice of supporting students during instruction resonates with Hand's (2012) notion that when students feel supported, they feel comfortable engaging in mathematical discourse with each other and the teacher.

Rigor in the Classroom

Borrowing from Hand's (2012) notion, participants in the current study utilized equitable mathematics teaching by engaging a wide-range of learners in rigorous mathematical inquiry. When examining the success of African American students in the area of mathematics, researchers cited characteristics of teachers' ability to support students with a rigorous curriculum (Gutierrez, 2000). Engaging students in rigorous mathematics can also be seen in Stein and Kaufman's (2010) definition of cognitive demanding instruction where the teacher "attends to students' thinking and uses students' responses to move the class toward the mathematical goals" (p. 671). Equally as important to understanding this sub-theme was the research identifying shifts of CCSSM to prepare students with the skills needed to think critically, and solve complex problems (Polly & Orrill, 2014; Rothman, 2012).

The research underpinning this study cautioned teachers with high proportions of African American and Hispanic American students of the dangers focusing on low level skills by not engaging them in problem solving and reasoning (Rousseau & Powell, 2005; Stein et al., 2009). Participants in this study engaged students in rigorous mathematical experiences, even though the characteristics they described of their students presented challenges to their implementation of CCSSM. At times participants recalled characteristics of their students that also fit the stereotypes of low performing students.

For example, Gary recollected, "some students lacked the proficiencies and some basic skills needed to master the expectations of Common Core." Norman described a typical student as one with "a little lower self-esteem when it comes to education." Toni shared, "A typical student in my class would be below level." Many teachers struggle to achieve rigor and although we see evidence of this challenge in the current study, all the teachers found ways to create classroom-learning environments that would emphasize active engagement in rigorous mathematics through different means.

Belinda looked for opportunities to engage a broad range of learners by making lessons more engaging for her students. She affirms, "If they [students] have no connection to the lesson, then it's not going to reach them. If your lesson is fun and they can connect to it, then you will have them engaged." Belinda's sentiments are echoed by Clark et al., (2014), suggesting that to support students' engagement in challenging tasks teachers should communicate enthusiasm, including encouraging students to persist without telling them how to complete the task. Belinda' described her preferred instructional strategies utilized to encourage her students to persist in the mathematics.

> I love group instruction. I love when students are interacting with each other. I love being a facilitator and not a teacher. I love to hear students talk about what they are learning and what they know. I love peer-to-peer and group instruction.

Her account recalls the ways she communicated her enthusiasm for her students' learning.

Gary found ways to build up his students' "mental capacity" as well as their confidence in order to engage them in the rigorous mathematical experiences. He saw

that once students experienced success, it would further influence their future success. Gary also felt the way to support his students' challenges was to focus their attention on the standards. He shared, "I stick to the standards. Not just to teach the standards, but to make sure they will be well equipped for the next grade." This notion was shared by Hand's (2012) claim that teachers can become powerful agents in improving classrooms inequalities for students.

Although Karen found ways to engage her students in rigorous mathematics experiences, she also found it challenging to support her students' achievement. She stated, "I have challenges when there are standards that they [students] are not mastering. There are a couple [standards] that no matter how we go back and reteach it, we still are not seeing the results. So, we stop and say I am just going to hit the critical component of it [the standard] and move on to spiral it into their learning later." Karen recognized the importance of effectively moving the classroom instruction to support students' mathematical achievement as asserted by Hand (2012). She described her experience below:

> Getting kids to complete rigorous activities, I engage them in CCSSM by reminding them of the SMP and I let them know what we are going to do. I communicate the intentions and let them know this is what I need you to do and this how we are going to do it.

Stein supports Karen's behaviors of communicating the learning targets to students and Kaufman's (2010) findings indicating a strong relationship existed between teachers who

studied the big mathematical ideas in the curriculum and those who implemented lessons at high levels.

Norman described some of the challenges his students faced engaging in rigorous mathematics and the practices he used to help them engage in CCSSM. He shared, "to help students think more and to implement Common Core, I have to use a lot of different strategies including on-line resources and a lot of technology." Frey et al., (2014) states the practice of effectively using technology in teaching to support students' learning is a key element characterizing the implementation of CCSSM.

Similarly, Toni struggled to support students who were still struggling to master the foundational standards. She indicated, "I feel like if they had a better foundation, they would cruise right through. I try to make it relevant for them and help them see the real-world connections by using task." Toni's reflections agree with Clark et al.,'s (2014), findings cautioning ethnically diverse students should not be shielded from engaging in challenging tasks. They further contended that students and teachers find value in engaging in successful implementation of complex tasks echoing Toni's narrative below:

> I had to learn to persevere. When I first started and they [students] didn't get it the first time, I asked myself what I did wrong. Then I had to realize that it may take more than one time or one way to engage in mathematical task. Basically, I asked them lots of questions while we are in the process. Making sure I go back and double check. I can look at their face and they may raise their hands and say

I understand; but asking those probing questions to ensure they really do understand helps a lot.

The excerpts above indicate participants utilized a variety of strategies to engage their students in rigorous mathematics. Throughout the interviews conducted, all participants' shared views and strategies used to counter the challenges students' demographics had on curriculum implementation by utilizing principles of equitable teaching. Belinda engaged students in rigorous mathematics by making instruction fun, utilizing cooperative learning strategies to promote discourse, and by pushing her students to persevere. Gary became a representative of his students' success. He helped students build their "mental capacity" by allowing them opportunities to experience success. Karen utilized strategies to cognitively engage her students by communicating the big learning goals of the standards. Norman found ways to engage more learners by utilizing technology tools, games and projects to support students' learning styles and interest. Toni engaged students in rigorous mathematics by holding task at high-cognitive demands and by proposing questions to check for students' understanding. Schoenfeld's (2002) findings suggested strong evidence of implementation of standards-based reform increased the percent of African American students performing well on assessments involving problem solving concepts.

Although these teachers practiced equitable teaching principles, in many incidents their responses lacked cultural consciousness through their silence of racial discussions. In many ways these teachers became change-agents in their schools. However, it is critical they begin discussions about their perceptions of racially diverse students

especially in increasing diverse racial settings such as the schools where these participants teach (Howard, 2003). Moreover, some responses indicated hints of low expectations for some students. One essential principle of culturally relevant pedagogy is to discard the "deficit-based thinking about culturally diverse students" (Howard, 2003, p. 197).

Theme 3: Organizational Structure Drive CCSSM

This theme highlighted the similarities in participants' responses to the classroom/school environmental influences impacting their implementation of CCSSM. Participants in this study indicated influences of the organizational structure of their school defined as the relationships between school composition (student, teacher population and school leadership), school context (location), and school practices on teaching and learning (Opdenakker & Damme, 2007). Participants' organizational structures had similar students' demographic compositions comprised of greater than 90% African American and Hispanic American students and their school context are closely located within their school district. However, the three schools were different in their school leadership, teaching and learning practices.

Even so, all participants in this study cited influences of the high-stakes testing on their implementation of CCSSM. High-stakes testing is defined as the practice educators use to make decisions concerning a student's progress based on the results of a standardized assessment score (Harrison-Jones, 2007). The evidence in this study indicated regardless of school, participants cited concerns of increased pressures of high-stakes accountability. This may be due to the important aspect of the organizational

structure, student composition on school practice and school outcomes (Opdenakker & Damme, 2007). In order to meet the expectations of NCLB, additional pressures are placed upon Georgia teachers by current teacher evaluation systems promoting student-centered academic environments in which teaching and learning occur at high levels (Georgia Department of Education, 2012). In response, school administrators often seek to control classroom instruction and inhibit teacher creativity and the enjoyment of teaching and learning.

Borrowing from Valli and Buese (2007), high-stakes accountability describes a climate of increased pressures experienced by educators in their efforts aimed at raising student achievement due to the implementation of *No Child Left Behind*. Like much of the research underpinning this study, some teachers provided specific examples of the influences of high-stakes accountability on their implementation of curriculum reform. Two participants, Belinda and Karen showed concern for their implementation of CCSSM and its impact on their teacher evaluation scores. Karen described her feelings in this manner, "What encourages me are my evaluations, I think what they [administrators] expect with Common Core is a little more challenging and difficult for kids." Belinda also shared her frustration with the school administration's over-reach into instructional matters:

> If my administrators don't agree that what I am doing is right, I have one thing in my mind of what I should be doing and they may say that I am not doing it right. That becomes a challenge for me. It becomes a discouragement at times.

The pressures and feelings of negative consequences expressed by Karen and Belinda exemplify Harrison-Jones' (2007) findings, reflecting the caution of the negative consequences teachers felt surrounding high-stakes accountability.

While Norman also expressed direct concerns, he was anxious future accountability measures would focus more on teacher data. He concluded, "As a state, we are looking at testing as an instrument to measure whether the teachers and students are doing well."

Norman's concerns were reflected in key elements of CCSSM as indicated by Frey et al.'s (2014) research. Frey et al., suggested the importance of states and policy makers addressing the inadequate current assessment tools while implementing CCSSM. This research called for a median between high-stakes assessments and the extreme accountability measures placed on low-performing schools.

Gary and Toni indicated indirect influences of high-stakes accountability. They shared concerns, which revealed less intentional expressions of the influences relating to their students' success. Although Gary didn't seem to share the same direct influences as Norman, his reflection was similar. He indicated teachers needed the ability to make adaptions for the students' they served and needed some adjustments in the way these students were assessed on state test. He stated, "I think although these standards are great, we should have some leeway to make adaptions for the students we serve." The concerns cited by Gary and the others reflect the literature, showing teachers felt the pressures to focus more on preparing students for high-stakes testing rather than the

expectations of the curriculum (Abrams, Pedulla, & Madaus, 2003; Harrison-Jones, 2007).

Similarly, Toni indicated the pressures of high-stakes testing caused her to move forward although she recognized the students she served needed more time to mastery the standards. She stated, "I feel like the standards are nice and they are very rich. However, I don't think the time we are given to actually teach the standards is sufficient for the amount of content expected." Participants' reflections confirm Harrison-Jones' (2007) view indicating many educators agree with the proposals of NCLB legislation's efforts to improve schools, but are discouraged by the negative concerns surrounding high-stakes accountability.

The teachers' concerns exemplified the literature documenting the impact high-stakes accountability environments can have on a teacher's practice during implementation of content standards (Abrams et al., 2003; Au, 2007; Diamond, 2007). Organizational structures of schools seem to significantly influence participants' implementation of CCSSM. Nevertheless, the teachers in this study seemed more encouraged to implement CCSSM standards to help students succeed rather than focus on the pressures of high-stakes testing (Abrams et al., 2003). Interestingly, the common practices exhibited by participants of having positive orientations towards CCSSM, their abilities to build positive teacher/student relationships to facilitate student learning and recognizing the constraints of organizational structures as driving influences of CCSSM, likely supported their ability to overcome all the red tape and still emerge as great teachers in their school.

Research Questions: Final Discussion

RQ1: What are the common practices used by teachers who find success implementing CCSSM with African American and Hispanic American students? This study revealed several common practices to exist among participants. All participants had common views navigating their implementation of CCSSM. First, participants' expressed positive orientations towards CCSSM as a means for influencing the development of their students' thinking. Participants all cited various ways they observed changes in their instructional practices. However, they each cited different changes including moving from direct instruction to increasing technology uses of on-line resources, and strategies to support students including building their experiences of success. Secondly, all the teachers pledged strong commitment to their students' success as part of the implementation of CCSSM. Although all the teachers' views and dispositions were positive towards the curriculum, some teachers made distinct mentions of the time constraints due to curriculum implementation and their collaboration process. Belinda, Karen and Toni found ways to plan strategically for what students needed to learn. Karen noted, "The teachers I plan with are on the same page. We all want to see the success, we all work hard, but we work together."

Thirdly, teachers recognized the significance of building positive teacher/student relationships to facilitate students' learning. The teachers in this study utilized the principles of equitable teaching to connect and engage their students in rigorous mathematics instruction. Nonetheless, the means of building the relationships varied among participants including attending outside of the classroom events of students,

providing students with extrinsic rewards, and using activities inside the classrooms to support their students' success. This study revealed evidence of low expectations for some students and a lack of attention to the cultural consciousness in the participants' responses to the interview questions.

Fourth, teachers also cited various strategies used to employ the principles of equitable teaching to implement rigorous mathematics instruction for their students. Teachers encouraged rigorous mathematics instruction by making it fun, utilizing games and cooperative learning strategies, implementing aspects of SMP, supporting students' academic challenges, communicating learning goals, increasing questioning techniques and incorporating technology. The findings also indicated the difficulties teachers faced while trying to promote rigor in the classroom. The teachers in this study had to make sense of the curriculum to support teaching and learning practices (Drake & Sherin, 2006). Toni used her collaboration with her colleagues to make significant decisions about the curriculum implementation. Thereby indicating that a teacher's ability to connect understandings among concepts and determine what was essential to the curriculum implementation is significant to the teachers in this study (Manouchehri & Goodman, 2000).

RQ2: What aspects of the classroom/school environment impact the common practices of teachers who find success implementing CCSSM with African American and Hispanic American students? All participants in this study revealed organizational structures of their schools drove their implementation of CCSSM including policy pressures such as high-stakes testing, composition of leadership and the students'

demographics. Belinda, Karen and Norman revealed direct concerns of pressures of high-stakes testing on their implementing CCSSM. Their responses varied indicating pressures from administrators to implement CCSSM to meet state and district expectations for student achievement. Belinda and Karen voiced specific concerns of negative effects on their teacher evaluations. Gary and Toni reveal pressures indirectly through their responses. They were concerned mainly with the pressures of time-constraints of implementing the standards and the lack of autonomy over the testing processes for African American and Hispanic American students. Toni felt planning more thoroughly, understanding the key aspects of the standards and reflecting "about how you taught it previously" supported her ability to implement the standards. Collectively, despite the pressures teachers faced due to the organizational structures of their school, they consistently focused on their students' learning.

Limitations of the Study

Findings in this study may be viewed through the lens of these participants due to the location of the study and the commonalities that may exist because they all worked within the same district with similar school compositions. Although qualitative research supports a small sample size and common patterns seemed to readily emerge from the sample of five teachers in this study, it is an acknowledged limitation. It may be beneficial to add participants and increase the number of schools in the sample with future studies to broaden the investigation of common patterns among successful teachers and provide maximum variation to enhance transferability. However, a detailed/thick

description of the context was provided to enable this study's findings to be transferable to solve a similar problem in a similar context or replicate the study.

There are possible limitations associated with self-reported data. The current study relied heavily on teachers' self-reported data through interviews and documents presented. In some instances, teachers may have presented responses influenced by personal bias, anxiety, and participants' awareness of the process (Patton, 2002). However, using two other sources to collect data mitigated this limitation. These included teacher and researcher documents and on site observations. It is important to caution that no particular data source is free of problems (i.e., document selection may have limitations in what the teachers were willing to provide and what they felt were good representations of their practice). These documents also relied heavily on the teachers' reliability since students' samples were not a part of this study. In this case, I relied on the conceptual framework, literature and personal knowledge to examine these documents for their reliability. I also utilized my personal observations of the teachers within their work environments to support my understanding of the data collected.

Finally, what I presented was one slice of the implementation of CCSSM by successful teacher models. Because I did not have formal interviews with other stakeholders such as administrators and the students, I am not in a position to triangulate what the teachers said about themselves with what other stakeholders say about the implementation practices. Future studies along this line will need to look at perspectives of teacher implementation by other individuals. Future studies will need multiple

perspectives on the same phenomenon. Such studies may need to select teachers from the same location with comparable experiences.

Implications of the Study

This study on the common practices of successful teachers of African American and Hispanic American students has implication for research, policy, and practice. The expectations of CCSSM to support efforts to close the achievement gap between European American, African American, and Hispanic American students are a challenge for many educators. Ensuring equal access to quality teachers, focused active learning environments and high-quality curricular resources for all students, is yet to be widely recognized (Smith, 2004, p. 111). It is important for all stakeholders responsible for the mathematics education of African American and Hispanic American students, particularly administrators and teachers, to hold high expectations for the academic achievement of these students. The teachers in this study successfully navigated CCSSM by focusing on their students' success. More importantly, schools need to promote positive relationships to help children succeed in mathematics.

Regardless of the research underpinning this study indicating the rising achievement gap for minority students, participants in this study did not succumb to the popular stereotypes about teaching African American and Hispanic American students. Costner, Daniels, and Clark (2010) found that many teachers express assumptions and express less positive attitudes toward teaching African American students. It is important for school and district leaders to provide discussions focused on practices centered on high-expectations for all learners. Administrators and school leaders should continue to

engage teachers in dialogue and professional development focused on employing the principles of equity when teaching minority students. This study suggests that when teachers place students' achievement at the center of their work, curriculum reform implementation is influenced in a positive way. The literature in this study embraces the idea that CCSSM can become a vital tool in supporting the achievement of minority students, essentially African American and Hispanic American students. Specifically, Schmidt and Hauang's (2012) simulations found higher NAEP scores resulted with states that had standards comparable to CCSSM. They concluded despite the challenges of CCSSM it offers opportunity to improve teaching and learning for all students. I argue this is only true when teachers are committed to their students' success.

Additionally, it is vital leaders and policy makers ensure schools, especially schools, which serve high populations of minority students, use quality curriculum resources to support the development of mathematical thinkers into classroom instruction. Teachers also need opportunities to collaborate with colleagues around ideas centered on strategies to support and extend students' thinking about CCSSM. This includes implementing mathematical tasks and rigorous standards-based curriculum resources. This proposal supports the research suggesting the implementation of tasks into mathematics instruction is critical to focusing students' attention on ideas as mathematical thinkers and self-regulated learners (Clark et al., 2014; Stein & Kaufman, 2010).

Although the teachers in this study engaged their students through utilizing equitable teaching principles, their lack of responses to the cultural awareness of their

students indicates a need to improve the culturally responsiveness of teachers supporting ethnically diverse students. It is critical school leaders provide opportunities for teachers to develop ways to build positive relationships to support reform practices which encouraged students to go deeper into mathematics.

While the implementation of CCSSM has opened the doors for the widely sharing of resources across schools, districts and states, it is important for school and district leaders to examine the resources selected by teachers and support their understanding and ways these resources are implemented with minority students. Efforts to understand teacher selection and orientations about curriculum resources can be included during teachers 'collaboration sessions, as well as during school and district professional development. According to Remillard and Bryans (2004), a teacher's orientation ultimately influences the opportunities in the classroom for teaching and learning.

Towards that end, schools and districts, which serve large populations of African American and Hispanic American students should utilize effective teachers as models of successful curriculum implementation not only in schools, but at the district level as well. Teachers who have consistently exhibited successful teaching practices with minority students can be used to impact the instruction of other teachers. Battey (2013) found common characteristics among successful teachers of African American and Hispanic American students including using relationships to support reform practices, which encouraged students to go deeper into the mathematics. Jackson (2013) also argued teachers who find success exhibit a combination of skills and attitudes, which can be learned and taught.

Recommendations for Future Research

Although the current study sought to add to the literature on the common practices utilized by teachers of African American and Hispanic American students using successful teacher models, further research is needed. Studies in this area should be given considerable attention by policy makers when developing policies, which affect the mathematics education of African American and Hispanic American students. The importance of research methodological approaches to include both racial and mathematics curriculum reform research are vital.

Although I have investigated the practices of teachers who find success implementing CCSSM and have found common themes do exist among these teachers, as suggested by the research, future studies are needed to examine teacher practice during classroom instruction with students. Further, research might include a longer more focused study utilizing interviews and observations of teachers in a wider variety of settings to support the creation of a more descriptive analysis of the common practices of these successful teacher models. Future studies may also include aspects of the students' voice related to the classroom practices of their teachers. One means of understanding the practices of classroom teachers is to observe the interactions of the students and teachers while implementing curriculum resources.

The current study was implemented to fill the gap in the literature identifying common practices used by teachers who find success implementing CCSSM with African American and Hispanic American students. This study illustrated the possibilities for teachers who recognize the power of teacher/student relationships in teaching CCSSM to

African American and Hispanic American students. This study also highlighted the ways teachers navigated curriculum implementation including, holding high expectations and making relevant cultural connections to students. Respondents of this study indicated the organizational structures poses classroom/school environmental pressures for teachers and often hinders their ability to be creative. However, additional literature is needed that identify the roles leaders and policy makers play in providing the support teachers need to create classroom/school environments where minority students are able to attain high levels of mathematical achievement using quality curriculum resources in safe, low pressured environments.

Conclusions

Even with the current goals of CCSSM, curriculum inequalities are still present in schools with large populations of African American and Hispanic American students (Darling-Hammond, 2000; Lewis, 2007; Smith, 2004). Teachers who predominately serve these minority students are challenged to create classroom-learning environments emphasizing students' active participation in meaningful mathematics (Darling-Hammond, 2000). School organizational structures should focus more on teacher support and less on the pressures of evaluation systems and test scores, which limit teacher creativity. The concerns presented in this research raise the questions of what do mathematics teachers need in order to teach African American and Hispanic American students.

The current study shows that in understanding the various pressures teachers face during eras of high-stakes testing and curriculum reform, it is possible to promote

student-centered academic environments in which teaching and learning occur at high levels. The teachers in this study recognized the challenges they faced teaching minority students. They navigated CCSSM by making their students' achievement central to their implementation of curriculum reform and by recognizing positive dispositions towards the curricula resources impacted their students' mathematical thinking.

For individuals aspiring to teach minority students mathematics in Georgia schools, this study offers opportunities for success in light of the challenges. This research is not intended to minimize the challenges for those new to teaching or for those who have been in the profession for a while. I hope this study helps teachers make realistic assessments of the demographic challenges of teaching minority students, and move forward recognizing the possibilities available. These possibilities include utilizing a standards-based curriculum, such as CCSSM, to provide rigorous classroom opportunities for students. This research meets at the intersection of not only the achievement of minority students and curriculum reform, but also during a time where there are changes taking place in the ways teachers are evaluated. This study creates awareness for educators to consider the needs and learning styles of minority students, allowing for the non-negotiables of curriculum implementation, teachers should demand time, professional development and collaboration with others who have found success. Consequently, results of this research offer hope of narrowing the achievement gap through continued conversations centered on successful practices, quality curriculum, and good teaching strategies for ethnically diverse students.

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APPENDIX A:

Recruitment Letter

To: Participant

From: Dina Savage

Date: May, 2015

Subject: Research participant for dissertation study at Valdosta State University

Greetings Teachers:

My name is Dina Savage, and I am conducting a dissertation study on exploring the common practices of teachers who find success implementing Common State Standards in Mathematics (CCSSM) with African American and Hispanic American students. I am looking for seven participants, and you were identified as an exemplary mathematics teacher. I am seeking to learn as much as I can about the experiences and common practices of teachers who find success implementing CCSSM with African American and Hispanic American students.

If you decide to participate in this research study, your involvement will include the following:

1. Participating in three audio-recorded interviews conducted by me.
2. Providing artifacts to highlight samples of your teaching experiences with CCSSM.

Congratulations on your successful teaching experiences thus far, and I hope you decide to participate in the study. Please feel free to contact me at any of the information provided below to further discuss this opportunity. Thank you in advance for your consideration.

Sincerely,

Dina L. Savage
Dina L. Savage
Doctorate Student – Education Leadership

Cell: 678-910-3199
dlsavage@valdosta.edu

APPENDIX B:

Formal Interview Protocol Questions

Background Interview

Introduction:

Thank you again for participating in this study. As you know, the purpose of the study is to find out more about the experiences and common practices of teachers who find success implementing CCSSM. This part of the study has two main components: If you decide to participate in this research study, your involvement will include the following:

1. Participating in three audio-recorded interviews conducted by me.
2. Providing artifacts to highlight samples of your teaching experiences with CCSSM.

Before beginning the interview, I wanted to see if you have any questions about the study or what you will be doing.

The purpose of today's interview is to find out about your background, in particular your experiences with mathematics and mathematics teaching.

1. Can you give me a description of your career as an educator?
    a. What were some of the events that led you to teaching as a career?
    b. What have been some of your greatest satisfactions while teaching?
    c. What have been some of your greatest disappointments while teaching?
    d. When have you felt empowered as a teacher?
    e. What have been some of the secrets to your success in teaching?
    f. What aspects of the classroom/school environment impact your implementation of Common Core State Standards for Mathematics with students?

g. How do you feel about teaching math? What do you feel comes pretty naturally for you? What aspects of teaching math have you found challenging?

h. What are the main things you do on a daily basis to engage your students in CCSSM?

Interview Two

Teacher Perceptions of CCSSM

The purpose of today's interview is to find out about your experiences implementing CCSSM.

2. I would like for you to reflect on CCSSM. How do you think that it has affected you and your teaching methods?

    a. What do you value most about Common State Standards for Mathematics?

    b. What do you value least about CCSSM?

    c. What encourages you to implement the standards with fidelity?

    d. What discourages you from implementing the standards with fidelity?

    e. How has CCSSM impacted your planning?

    f. How has CCSSM impacted the instruction of the students you teach in particular?

    g. What is your preferred instructional strategy when teaching mathematics?

    h. How do you encourage your students to participate in mathematics instruction?

    i. Describe a typical mathematics student in your class.

j. What concerns do you have going forward with CCSSM?

Interview Three Questions

3. Interview three questions will result from an analysis, reflection, and preliminary interpretation of the transcription of the prior two interviews. The goal of the third interview is to gain insight into the teachers' meaning and reflection about their practice and experiences.

APPENDIX C

Artifacts Collected Coversheet

Introduction:

Thank you again for participating in this study. As you know, the purpose of the study is to find out more about the experiences and common practices of teachers who find success implementing CCSSM. This part of the study has two main components: If you decide to participate in this research study, your involvement will include the following:

1. Participating in three audio-recorded interviews conducted by me.
2. Providing artifacts to highlight samples of your teaching experiences with CCSSM.

The purpose of collecting documents is to illustrate how you implement tasks in your mathematics instruction.

A. Briefly identify the task students were asked to complete

B. Briefly describe the directions given to the students and expectations for the students' work

C. Provide copies of the task, any rubrics, criteria sheets or scoring guides.

APPENDIX D:

Belinda's: Artifacts Collected Coversheet

Introduction:

Thank you again for participating in this study. As you know, the purpose of the study is to find out more about the experiences and common practices of teachers who find success implementing CCSSM. This part of the study has two main components: If you decide to participate in this research study, your involvement will include the following:

3. Participating in three audio-recorded interviews conducted by me.
4. Providing artifacts to highlight samples of your teaching experiences with CCSSM.

The purpose of collecting documents is to illustrate how you implement tasks in your mathematics instruction.

A. Briefly identify the task students were asked to complete

Students were asked to complete the task in small groups of 3-5 over multiple days.

B. Briefly describe the directions given to the students and expectations for the students' work

Students were given directions and guided instruction to begin the task. Then students were directed to complete the remaining items in small groups while I facilitated small groups by asking questions to direct students' learning.

C. Provide copies of the task, any rubrics, criteria sheets or scoring guides.

BraceletBusiness

Sample Pages from Belinda's Task

Bracelet Business Task
Equations and Functions

Name_____
Date_____
Class_____

1.) What amount of money did each seller initially invest in buying supplies? *Use the info chart.*

LaToya		Jasmine		Rachel	

2a.) Write an equation in slope intercept form for each seller to represent total earnings minus the initial investment.

LaToya		Jasmine		Rachel	

As you write the equations, think about all of the elements of a slope intercept equation y=mx+b. How should you express each element for each seller so that each equation will reflect the investment, the price per bracelet, the number of bracelets sold, and total earnings?

2b.) What does x represent _____

2c.) What does m represent? _____

2d) What does y represent? _____

2e.) What does b represent? _____

2f.) Do all equations from #2 represent linear functions?_____
Explain your reasoning. _____

_____

2g.) Is it possible to tell if each equation represents a proportional relationship or not? _____ Are any of these equations proportional?_____Explain _____
_____
_____

3a.) Create a function table of values for each seller.
Find f(x) when x = {0,1,2,3,4,5,6,7,8}

LaToya

Jasmine

Rachel

3b.) What is the constant rate of change for each seller?

LaToya		Jasmine		Rachel	

3c.) What is another term for constant rate of change?_____

_____

3d.) Does each table represent a function?_____
Explain your reasoning._____

_____

3e.) Does each table represent a linear function?_____
Explain_____

_____

3f.) Does each table represent a proportional relationship?_____

_____

APPENDIX E:

Gary's: Artifacts Collected Coversheet

Introduction:

Thank you again for participating in this study. As you know, the purpose of the study is to find out more about the experiences and common practices of teachers who find success implementing CCSSM. This part of the study has two main components: If you decide to participate in this research study, your involvement will include the following:

5. Participating in three audio-recorded interviews conducted by me.
6. Providing artifacts to highlight samples of your teaching experiences with CCSSM.

The purpose of collecting documents is to illustrate how you implement tasks in your mathematics instruction.

D. Briefly identify the task students were asked to complete

Students were asked to investigate the cross sections and determine the three-dimensional shapes that would yield the given characteristics. This tasks' goal was for students to explore the relationships between two-dimensional and three dimensional figures.

E. Briefly describe the directions given to the students and expectations for the students' work. Students were paired for this activity. Students were paired for this activity. A brief overview of cross-sections was given, I noted key vocabulary, like parallel and perpendicular slices. Students were also given manipulatives of geometric three-dimensional shapes with water and encouraged to use them. Students also had play-dough and dental floss available to create and cut any shapes while exploring the concepts.

F. Provide copies of the task, any rubrics, criteria sheets or scoring guides

Gary's Artifact

Name _____ Date ____

Exploring Cross Sections of Three-Dimensional Objects

Cross Sections of a Cube

Is it possible to make each of the following cross sections by slicing a cube?

a. Square

b. Equilateral triangle

c. Rectangle, not a square

d. Triangle, not equilateral

e. Pentagon

f. Regular hexagon

g. Hexagon, not regular

h. Octagon

i. Trapezoid, not a parallelogram

j. Parallelogram, not a rectangle

k. Circle

Record which of the shapes you were able to create and how you did it. If you can make the shape, explain why not.

Describe, name, and sketch any additional cross-sections that are possible and explain why they are possible.

Predict the possible cross-sections for these solids. Explain how you know that these are possible cross-sections.

- Cylinder

- Cone

- Sphere

Use models of the above solids to confirm your predictions.

Sketch and describe the cross-sections.

Name three plane figures which cannot be formed from cross-sections of the above figures and explain why they cannot be formed.

APPENDIX F:

Karen's: Artifacts Collected Coversheet

Introduction:

Thank you again for participating in this study. As you know, the purpose of the study is to find out more about the experiences and common practices of teachers who find success implementing CCSSM. This part of the study has two main components: If you decide to participate in this research study, your involvement will include the following:

7. Participating in three audio-recorded interviews conducted by me.
8. Providing artifacts to highlight samples of your teaching experiences with CCSSM.

The purpose of collecting documents is to illustrate how you implement tasks in your mathematics instruction.

A. Briefly identify the task students were asked to complete

   Students will work in small groups of 2-3 students to complete the task.

B. Briefly describe the directions given to the students and expectations for the students' work

   Students were given a set of 10 circular objects to choose from. Students were asked to measure the circumference and the diameter using string and a measuring stick in cm. Using one CD the activity was demonstrated to the class and one example was filled in the table. Students were asked to complete the remainder of the task in small groups.

C. Provide copies of the task, any rubrics, criteria sheets or scoring guides.

Name: _____ Date: _____

Pd.: _____

The relationship between parts of a Circle

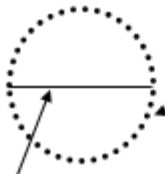
Apple π

Directions:

Using a piece of string and your ruler, measure/find the distance around each circle (centimeters). To find the distance across the middle, trace the circle onto a piece of paper, fold the circle in half 2 times, and measure the length of one of the lines going through the center point (centimeters). Use your calculator to find the ratio.

|

	Distance Around	**Distance Across the Middle**	**Ratio:** $\frac{\text{Distance Around}}{\text{Distance Across the Middle}}$	**Ratio in Decimal Form**
Paper Cup				
Plastic Cup				
Bowl				
Paper Circle				
CD				
What is the mean value of the ratios? What do they represent?				



The perimeter of any circle is called the _____.

The distance across the middle of any circle is called the _____.

Formula of Circumference:

APPENDIX G:

Norman's: Artifacts Collected Coversheet

Introduction:

Thank you again for participating in this study. As you know, the purpose of the study is to find out more about the experiences and common practices of teachers who find success implementing CCSSM. This part of the study has two main components: If you decide to participate in this research study, your involvement will include the following:

9. Participating in three audio-recorded interviews conducted by me.
10. Providing artifacts to highlight samples of your teaching experiences with CCSSM.

The purpose of collecting documents is to illustrate how you implement tasks in your mathematics instruction.

D. Briefly identify the task students were asked to complete

   Students will demonstrate the ability to both translate verbal quantitative situations into algebraic expressions and evaluate expressions when given the value for each variable.

E. Briefly describe the directions given to the students and expectations for the students' work

   See attached lesson for directions given to students. Each student was expected to work collaboratively in a group of 3. They were to share all questions and possible answers within their group before seeking answers outside or their groups. Each student was free to travel to other groups to share questions and answers. At the end of the lesson, the students were expected to be able to orally defend their responses to the particular assessment assignment given to

demonstrate their level of understanding of translating and evaluating expressions.

F. Provide copies of the task, any rubrics, criteria sheets or scoring guides.

Sample Pages from Norman's Task

Translate and Evaluate

Reporting Category	Expressions and Operations	
Topic	Representing quantitative situations algebraically and evaluating and simplifying algebraic expressions	
Primary SOL	A.1	The student will represent verbal quantitative situations algebraically and evaluate these expressions for given replacement values of the variables.

Materials

- Sample Graphic Organizer for Mathematical Operations and Symbols (attached)
- Mathematical Translations Matching activity sheet (attached)
- Snack-size bags of colored candies or number cubes
- Evaluating Expressions with Candy activity sheet (attached)
- Calculators

Vocabulary

algebraic expressions, symbolic representations, minimum (earlier grades)

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. Write a common word or phrase on the board in another language and ask students to translate it into English. Compare this sort of translation to the process of translating words into numbers and mathematical symbols.
2. Ask students to translate the following into numbers and mathematical symbols:
   - your allowance plus a bonus of $15.75
   - the number of dogs increased by 9 is 20
   - the cost of the pants at 30% off
   - 3 gallons of tea was poured into two containers of different sizes. Express the amount of tea in the smaller container in terms of the amount t poured into the larger container.

   Have students share their answers and discuss as a class. Discuss vocabulary terms as they arise.
3. Distribute the Sample Graphic Organizer for Mathematical Operations and Symbols. Have students complete the sheet. Share responses and discuss as a class.
4. Distribute the Mathematical Translations Matching activity sheet. Have students cut out the squares and pair matching equations and expressions. After students make their matches, have them sort their piles into equations and expressions. Have students check their work by comparing with a partner. Discuss as a class.
5. Present students with the expression $2b - c$ and ask students if they can simplify it. Students should realize that there is nothing they can do with this expression, since they do not know the values of the variables b and c.

6. Tell students that b=5 and c=3. Ask if they can now simplify the expression. Be sure students use the correct order of operations. Provide other examples.
7. Distribute the Evaluating Expressions with Candy activity sheet and snack-size bags of colored candies. The colors will represent the variables. Have students sort their candy according to color and record the values on the activity sheet. If you prefer not to use candy, have students roll a number cube six times to establish values for each of the variables.
8. Students will evaluate each expression, using the values of the candy (or rolls of a number cube). Be sure students show all steps in evaluating the expression.

Assessment

- **Questions**
  - What is the difference between an expression and an equation?
  - Why is it important to be able to write verbal expressions as algebraic expressions and sentences as equations and vice versa?
- **Journal/Writing Prompts**
  - Jack says "six less than a number is four" is written as $6 - n = 4$. Jane says he is incorrect and that it should be written as $n - 6 = 4$. Identify who is correct, and explain why.
  - Explain to a classmate that has been absent how to evaluate expressions.
- **Other**
  - Have students create their own matching expressions and equations game and give it to a partner to check for accuracy.
  - Have students create a domino-type game for evaluating expressions.

Extensions and Connections (for all students)

- Incorporate negative numbers into the activities.
- Have students explore number magic games, and have them represent the number tricks numerically, visually, and algebraically.
- Play a BINGO-type game in which students translate expressions and equations.
- Have students play a "I Have, Who Has?" game for translating or substitution.

Strategies for Differentiation

- Use graphic organizers for vocabulary.
- Color code the different parts of an expression or equation written in words before translating it to mathematical symbols.

Evaluating Expressions with Candy

Name _____ Date _____

Separate your bag of candy into color sets designated with the following variables.

g=green *b*=blue *d*=dark brown *r*=red *n*=orange *y*=yellow

Record the number in each set to find the values of each variable.

g=_____ *b*=_____ *d*=_____

r=_____ *n*=_____ *y*=_____

Evaluate each expression for the replacement values found above.

$5r + 2d$ $6 + 5(y + g)$ $3y - 5b$

$b^2 + 3b - 10$ $(3r + 6) - d$ $(4g - 2)^2$

$|7 - 2n|$ $\sqrt{2y} - rd$ $|\frac{2}{5}g - 5b| - \sqrt[3]{125}$

Create two expressions of your own and have a classmate evaluate them using their data.

_____ _____

Evaluate two expressions created by a classmate using your data and show all work below.

_____ _____

APPENDIX H:

Toni's: Artifacts Collected Coversheet

Introduction:

Thank you again for participating in this study. As you know, the purpose of the study is to find out more about the experiences and common practices of teachers who find success implementing CCSSM. This part of the study has two main components: If you decide to participate in this research study, your involvement will include the following:

11. Participating in three audio-recorded interviews conducted by me.
12. Providing artifacts to highlight samples of your teaching experiences with CCSSM.

The purpose of collecting documents is to illustrate how you implement tasks in your mathematics instruction.

> *Systems of linear equations are a useful way to solve common problems in different areas of life. One of the most powerful ways to use them is in a comparison model where two similar situations are compared side by side to determine which one is better. In this project, you will be choosing between two real life situations and then using systems of linear equations to decide what to buy. The two situations are:*

A. Briefly identify the task students were asked to complete

   Students were asked to complete a comparison model where two similar situations were compared side by side to determine which one was better using Systems of Equations.

B. Briefly describe the directions given to the students and expectations for the students' work

Students were given two real life situations to choose from and create a comparison model using systems of equations. Students were expected to conduct research on their topic and use their data to create a word problem. Student were then expected to use their word problem to create a system of equations. Lastly the students were expected to solve the system and present their findings neatly on a poster board.

C. Provide copies of the task, any rubrics, criteria sheets or scoring guides.

Systems of Linear Equations Project

Introduction

Systems of linear equations are a useful way to solve common problems in different areas of life. One of the most powerful ways to use them is in a comparison model where two similar situations are compared side by side to determine which one is better. In this project, you will be choosing between two real life situations and then using systems of linear equations to decide what to buy. The two situations are:

1. Cell phone plans, comparing monthly fee and price per gig of data.

2. Two cars, comparing the base price (the cost of the car) and the cost of driving the car.

Cell Phone Plans

Situation: You have graduated from high school and moved away to college. Your parents have decided that it's time for you to pay for your own cell phone. You have to stick to a strict budget and plan to spend no more than $45 per month. Now you need to determine whether you should go with a plan that costs more per month but charges less per gig of data or a cheaper plan that charges more for data.

Assignment: Gather information from Sprint and AT&T through their websites. **NOTE: You cannot purchase unlimited data plans for this exercise. T**hen write a system of linear equations for the two plans and create a graph. Use the methods we have been studying to determine which plan is better based on the amount of data used per month.

Car Comparison

Situation: You just got your first job and have decided that it's time to buy a car. You've narrowed it down to either a
2015 Chevy Camaro or a 2015 Toyota Prius. The Prius cost a bit more but gets better gas mileage, so will cost less to drive. **NOTE: For simplicity, let's say gas cost $ per gallon.** Determine how long it will take until you've spent more on the Camaro than you would have on the Prius to make your decision.
Assignment: You will gather information (price of the car and the miles per gallon) for each of the cars. Then you will write a system of linear equations for the two cars and create a graph to determine which will be the better buy.

Project Details

Today, you will decide which project you want to do. After you decide on a project, you will need to:

1) **Collect** the data.
2) Write the system of linear equations and a word problem once the data has been collected.
3) Use the methods we have been studying (graphing and solving algebraically) to find the solution to the written system.
4) Designing the final display of the project on a piece of white paper.

Project Rubric

25 points = Data for the scenarios.
- 20 points = Data
- 5 points = Timely data collection

25 points = Word problem and the system of equations
- 10 points = Word problem is correct
- 15 points = Both equations are accurate

25 points = Algebraic solution
- 15 points = Correct solving
- 5 points = Explanation/Work shown
- 5 points = Check

25 points = Final Project
- 15 points = Creativity
- 10 points = Final product organized

APPENDIX I:

Valdosta Consent for Anonymous Survey in Research

VALDOSTA STATE UNIVERSITY

Consent Statement for Anonymous Survey Research

You are being asked to participate in a survey research project entitled *"Implementation of Common Core Mathematics with African American and Hispanic American Students: Successful Common Practices,"* which is being conducted by *Dina L. Savage,* a *student* at Valdosta State University. This survey is anonymous. No one, including the researcher, will be able to associate your responses with your identity. Your participation is voluntary. You may choose not to take the survey, to stop responding at any time, or to skip any questions that you do not want to answer. You must be at least 18 years of age to participate in this study. Your completion of the survey serves as your voluntary agreement to participate in this research project and your certification that you are 18 or older.

If you decide to participate in this research study, your involvement will include the following:

1. Participating in three audio-recorded interviews lasting approximately 90 minutes conducted by me.
2. Providing artifacts to highlight samples of your teaching experiences with CCSSM.

Questions regarding the purpose or procedures of the research should be directed to *Dina L. Savage* at *678-910-3199* or *dlsavage@valdosta.edu*. This study has been exempted from Institutional Review Board (IRB) review in accordance with Federal regulations. The IRB, a university committee established by Federal law, is responsible for protecting

the rights and welfare of research participants. If you have concerns or questions about your rights as a research participant, you may contact the IRB Administrator at 229-259-5045 or irb@valdosta.edu.

NOTES TO RESEARCHER: If you are administering the survey via the Internet, make sure that the software parameters are set to allow participants to skip questions. If you will be making the research results available on a website, you may inform the participant of where and when the results will be posted. Do not instruct the participant to provide his/her name and mailing or email address on any survey documents or suggest any other method of requesting research results that destroys the participant's anonymity. If you will be mailing the results to the participants, provide them with a blank envelope on which they may write their name and address. Collect these envelopes separately from completed surveys so that survey responses cannot be linked to identities.

APPENDIX J:

Valdosta Protocol Exemption Report

Institutional Review Board (IRB)
for the Protection of Human Research Participants

PROTOCOL EXEMPTION REPORT

PROTOCOL NUMBER: IRB-03211-2015 **INVESTIGATOR:** Dina Savage

PROJECT TITLE: Implementation of Common Core State Standards for mathematics with African American

INSTITUTIONAL REVIEW BOARD DETERMINATION:

This research protocol is **exempt** from Institutional Review Board oversight under Exemption Category(ies) :1. You may begin your study immediately. If the nature of the research project changes such that exemption criteria may no longer apply, please consult with the IRB Administrator (irb@valdosta.edu) before continuing your research.

ADDITIONAL COMMENTS/SUGGESTIONS:

Although not a requirement for exemption, the following suggestions are offered by the IRB Administrator to enhance the protection of participants and/or strengthen the research proposal:

NONE

☐ If this box is checked, please submit any documents you revise to the IRB Administrator at irb@valdosta.edu to ensure an updated record of your exemption.